

**Financial Institutions (Banks) Mergers; Regulation, Efficiency, Value Creation  
and Risk**



**Mohamad Hassan**

A thesis submitted in partial fulfilment of the requirements for the degree of Doctor  
of Philosophy

Director of Studies: Dr Evangelos Giuovris

Second Supervisor: Dr Li Matthew

School of Business and Management

Accounting and Financial Management

**Royal Holloway, University of London**

**Egham Hill, Egham TW20 0EX**

**September 2019**



## *Abstract*

Ring-fencing and higher capital requirements are the themes of the 2008-2011 crisis aftermath regulations worldwide. However, banks are moaning the pressing effects of these regulations on their profits and efficiencies, pursuing them to innovate. Innovation usually leads to deregulation, which gradually becomes a system-wide risk. This thesis utilises the Institutional Theory to investigate how financial institutions can expand through consolidation to grow profitably via maximising returns and wealth but also limiting risks.

Results show that Market and Product Development strategies enable value creation for shareholders both in short and the long run, while Diversification strategies do not. Shareholders value drives long-run economic value for North American bank, but this value is adversely affected by credit risk appetite in Australasian bank focused mergers. Results emphasise the negative impact of high capital buffers (Basel III) on funds available for lending. Official supervisory powers drive productivity growth in all regions except Europe and Central Asia. Activity restrictions on real estate, insurance, and securities businesses, are negatively associated with productivity change in all Income level groups but High Income. Improvements in pure technical efficiency appear to be at the cost of equity value and profitability. On the risk frontier, systematic risk is negatively influenced by economic value addition, financial freedom and bank concentration, but positively associated with return on assets and leverage growth. This outcome provides evidence that improvements in operating profit and well-controlled cost of capital can undoubtedly contribute to decreasing systematic risks. National bank deals, focused and diversified, appear to have less systematic risk generated in the realm of more financial freedom accompanied by a moderate to a high concentration. Large banks contribute to increasing the systemic risk contribution in national deals. Sustainability growth rate improves in all diversifying deals and decreases systemic risk.

# *Declaration of Authorship*

I, **Mohamad Hassan** declare that this thesis and the work presented in it are my own and has been generated by myself as the result of my own original research.

## **Financial Institutions (Banks) Mergers; Regulation, Efficiency, Value Creation and Risk**

### **I confirm that:**

1. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
  2. Where I have consulted the published work of others, this is always clearly attributed;
  3. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
  4. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
- Parts of this work have been published or accepted for publication: **Chapter 2:** HASSAN, M. & GIOUVRIS, E. 2019. [Forthcoming-2019]. Financial Institutions Mergers; A strategy Choice of Wealth Maximisation and Economic Value. *Journal of Financial Economic Policy*. Available on <https://www.emerald.com/insight/content/doi/10.1108/JFEP-06-2019-0113/full/html>
  - **Chapter 3:** HASSAN, M. & GIOUVRIS, E. 2019. [Forthcoming-2019]. How Bank Regulations Impact Efficiency and Performance? *Journal of Financial Economic Policy*. Available on <https://www.emerald.com/insight/content/doi/10.1108/JFEP-06-2019-0119/full/html>
  - **Chapter 4:** HASSAN, M. & GIOUVRIS, E. 2019. Bank Mergers' Risks; the Macro and Micro Prudential approaches and their determinants. International Risk Management Conference. Bocconi University, Milan, Italy: The Risk Society.

Signed: .....

Date: .....

## ***Acknowledgements***

*I would like to thank my advisor and director of studies Dr Evangelos Giouvriss for his invaluable support throughout the course of my research and studies. My appreciation also goes to my second supervisor, Dr Li Matthew for his usual availability and support and vital advice and recommendations. I would also like to thank all the department of Accounting, Finance and Economics and the School of Management members, colleagues and staff for the usual and never-ending support, especially Professor Paul Robson, Dr Amany Elbanna and Professor Elena Giovannoni. My gratitude goes to remarkable academics whose advice made a great contribution to my research and publications, especially professor Elena Carletti and Professor John Goddard. I am forever indebted to my family; father, mother, wife, sister and brothers, and my two angels Jawad and Raneem, for the continuous material and emotional support.*



## *Dedication*

*To the unequivocally supporting aspirer; My Father, Haj  
Hussein,*

*To the Queens in my life; my mother Asmahan and my Wife  
Hiba,*

*To the inspiring angels Juwad, Raneem,...*

# Table of Contents

<b>1</b>	<b>INTRODUCTION AND LITERATURE REVIEW</b>	<b>19</b>
1.1	INTRODUCTION	20
1.2	THE GLOBAL LANDSCAPE OF M&A	25
1.3	LITERATURE REVIEW	31
1.3.1	<i>Mergers examination; a theoretical framework</i>	32
1.3.2	<i>Thesis Outline</i>	33
1.3.3	<i>Bank regulation; recent rumbles and procyclicality</i>	35
1.3.4	<i>“Economy-Regulatory” Cycles and Strategic Choices</i>	39
1.3.5	<i>Mergers and innovation</i>	42
1.3.5.1	<i>Diversification versus focus</i>	44
1.3.6	<i>Hypotheses and Research Questions</i>	49
1.3.7	<i>Empirical Literature; assessment strategies and motivation</i>	53
1.3.8	<i>Shareholders value and economic and financial performance</i>	54
1.3.8.1	<i>Contribution and Main Results</i>	58
1.3.9	<i>Banking Regulation and Productivity and Performance</i>	60
1.3.9.1	<i>Bank regulation and productivity</i>	61
1.3.9.2	<i>Contribution and main results</i>	63
1.3.10	<i>Bank Mergers and Systematic and Systemic Risks</i>	66
1.3.10.1	<i>Diversification-Stability</i>	67
1.3.10.2	<i>Diversification-Fragility</i>	67
1.3.10.3	<i>Contribution and Main Results</i>	68
1.3.11	<i>Appendix</i>	71
<b>2</b>	<b>FINANCIAL INSTITUTIONS MERGERS; SHAREHOLDERS, ECONOMIC VALUE AND FINANCIAL PERFORMANCE</b>	<b>78</b>
2.1	INTRODUCTION	79
2.2	FINANCIAL INSTITUTIONS MERGERS: A LITERATURE REVIEW	84
2.2.1	<i>Financial Institutions mergers: Empirical Evidence</i>	85
2.3	DATA AND METHODOLOGY	92
2.3.1	<i>Data Sample</i>	92
2.3.2	<i>Methodology</i>	96

2.3.2.1	Event Study; Market Perception .....	97
2.3.2.2	Buy and Hold Abnormal Returns .....	99
2.3.3	<i>Observed Performance</i> .....	102
2.4	RESULTS .....	106
2.4.1	<i>Shareholders value and FIs mergers</i> .....	109
2.4.2	<i>FIs mergers: a multivariate analysis</i> .....	124
2.4.2.1	Pre-merger performance and shareholder value.....	125
2.4.2.2	Post-merger performance and shareholder value .....	130
2.4.3	<i>Mergers and acquisitions and regional differences</i> .....	135
2.5	CONCLUSION .....	139
2.6	APPENDIX .....	143
2.6.1	<i>EVA Calculation</i> .....	143
2.6.2	<i>Two Years of Pre-merger performance effect</i> .....	144
2.6.3	<i>Mixed Effect ML regression of CARs and BHARs, excluding ROI</i> .....	145

### **3 REGULATION AND BANK EFFICIENCY, PRODUCTIVITY AND OVERALL**

#### **PERFORMANCE ..... 146**

3.1	INTRODUCTION .....	147
3.2	LITERATURE REVIEW.....	151
3.2.1	<i>The impact of bank regulation and compliance on bank performance</i> .....	152
3.2.2	<i>Bank regulation and productivity</i> .....	153
3.2.3	<i>Bank regulations perspective determinants</i> .....	155
3.3	DATA AND METHODOLOGY .....	158
3.3.1	<i>Data set</i> .....	158
3.3.2	<i>Methodology and Malmquist Index Construction</i> .....	160
3.3.3	<i>Environmental variables (R)</i> .....	164
3.3.4	<i>Bank Specific Variables (B)</i> .....	165
3.3.5	<i>Macroeconomic variables (Z)</i> .....	166
3.4	RESULTS .....	168
3.4.1	<i>Regulation, efficiency and TFP change</i> .....	174
3.4.2	<i>TFP efficiencies change, regulations and market factors</i> .....	180
3.5	CONCLUSION .....	186
3.6	APPENDIX .....	189

3.6.1	<i>Information on financial and accounting variables and scalars for TFP calculations. ....</i>	189
3.6.2	<i>Efficiencies association with Regulatory and Macro-Environment variables categorised over Income levels. ....</i>	192

## **4 FINANCIAL INSTITUTIONS MERGERS; SYSTEMATIC AND SYSTEMIC RISKS**

### **193**

4.1	INTRODUCTION .....	194
4.2	BANK MERGERS AND RISKS; A LITERATURE REVIEW .....	199
4.2.1	<i>Diversification-Stability .....</i>	200
4.2.2	<i>Diversification-Fragility .....</i>	201
4.2.3	<i>Financial Institutions Risk; Empirical Literature .....</i>	204
4.2.4	<i>Financial Institutions Risk and crisis .....</i>	205
4.2.5	<i>Financial Institutions Risk Measures .....</i>	206
4.3	DATA AND METHODOLOGY .....	209
4.3.1	<i>Dataset .....</i>	211
4.3.2	<i>Returns and beta estimation .....</i>	213
4.3.3	<i>Systematic Risk – <math>\theta</math> (<math>\beta</math>) and <math>\beta^*</math> .....</i>	215
4.3.4	<i>Systemic Risk .....</i>	218
4.3.5	<i>Sensitivity and Inference analysis.....</i>	221
4.3.5.1	<i>Regulatory variables.....</i>	221
4.3.5.2	<i>Efficiency Variables.....</i>	222
4.3.5.3	<i>Sustainability Growth .....</i>	223
4.3.5.4	<i>Economic Value Addition .....</i>	224
4.4	SUMMARY STATISTICS.....	226
4.5	RESULTS .....	231
4.5.1	<i>Systematic Risk (<math>\Delta\beta</math> and <math>\beta^*</math>) and Capital Shortfalls (LRMES) .....</i>	232
4.5.1.1	<i>Systematic risk and merger geographic orientation .....</i>	236
4.5.1.2	<i>Systematic risk and merger’s activity orientation .....</i>	238
4.5.2	<i>Systemic Risk (SRISK) .....</i>	243
4.5.2.1	<i>Systemic risk and geographic diversification.....</i>	247
4.5.2.2	<i>Systemic risk and FIs targets .....</i>	249
4.5.3	<i>Risk, diversification and crisis.....</i>	257
4.5.4	<i>Target FIs Risk and Performance.....</i>	268
4.5.5	<i>Multivariate analysis of risks.....</i>	271

4.5.5.1	Systemic risk instrumented by $\Delta\beta$ .....	273
4.5.5.2	Systemic risk, endogeneity and exogenetic .....	277
4.6	CONCLUSION .....	281
4.6.1	<i>Appendix</i> .....	286
<b>5</b>	<b>CONCLUSION</b> .....	<b>288</b>
	REFERENCES LIST .....	300

# *List of Figures*

FIGURE 1-1 GLOBAL M&A VOLUMES 2001-2017 (US\$ TN) SOURCE: DEALOGIC AND JP MORGAN.....	25
FIGURE 1-2 FINANCIAL INSTITUTIONS; MERGER DEAL NUMBERS AND VALUE OF DEALS AND THEIR DISTRIBUTION BY TARGET INSTITUTION INDUSTRY. ....	27
FIGURE 1-3 BANK MERGER AND ACQUISITION DEAL VALUE (IN USD MIL.) OVER REGIONS AND YEARS FROM 1999 TO 2017. ....	28
FIGURE 1-4 DISTRIBUTION OF BANK MERGERS DEAL NUMBERS OVER DEAL TYPE TOWARDS GEOGRAPHIC AND ACTIVITY FOCUS AND DIVERSIFICATION, AND REGIONS. ....	29
FIGURE 1-5 THEORETICAL FRAMEWORK OF ANALYSING THE EFFECTS OF FINANCIAL INSTITUTIONS AND BANK MERGERS ON RISK AND RETURNS.....	34
FIGURE 1-6 PRODUCT-MARKET STRATEGIES - ANSOFF (1958).....	44
FIGURE 1-7 ANSOFF'S MATRIX OF PRODUCT-MARKET STRATEGIES VERSUS PERCEIVED RISKS AND RETURNS. ADAPTED ANSOFF'S (1658) MATRIX. ....	47
FIGURE 1-8 EASTERN EUROPE FINANCIAL INSTITUTIONS MERGERS; NUMBER AND VALUE OF DEALS (+US\$100 MIL, 1999-2018) AND THEIR DISTRIBUTION BY TARGET INSTITUTION INDUSTRY.....	71
FIGURE 1-9 NORTH AMERICA FINANCIAL INSTITUTIONS MERGERS; NUMBER AND VALUE OF DEALS (+US\$100 MIL, 1999-2018) AND THEIR DISTRIBUTION BY TARGET INSTITUTION INDUSTRY.....	72
FIGURE 1-10 WESTERN EUROPE FINANCIAL INSTITUTIONS MERGERS; NUMBER AND VALUE OF DEALS (+US\$100 MIL, 1999-2018) AND THEIR DISTRIBUTION BY TARGET INSTITUTION INDUSTRY.....	73
FIGURE 1-11 ANJ- FINANCIAL INSTITUTIONS MERGERS; NUMBER AND VALUE OF DEALS (+US\$100 MIL, 1999-2018) AND THEIR DISTRIBUTION BY TARGET INSTITUTION INDUSTRY. ....	74
FIGURE 1-12 LATIN AMERICA FINANCIAL INSTITUTIONS MERGERS; NUMBER AND VALUE OF DEALS (+US\$100 MIL, 1999-2018) AND THEIR DISTRIBUTION BY TARGET INSTITUTION INDUSTRY.....	75
FIGURE 1-13 ASIA FINANCIAL INSTITUTIONS MERGERS; NUMBER AND VALUE OF DEALS (+US\$100 MIL, 1999-2018) AND THEIR DISTRIBUTION BY TARGET INSTITUTION INDUSTRY. ....	76
FIGURE 1-14 AFRICA FINANCIAL INSTITUTIONS MERGERS; NUMBER AND VALUE OF DEALS (+US\$100 MIL, 1999-2018) AND THEIR DISTRIBUTION BY TARGET INSTITUTION INDUSTRY. ....	77
FIGURE 2-1 HISTORIC FINANCIAL PERFORMANCE OF FIS INVOLVED IN A MERGER BETWEEN 1995 AND 2018. ....	123
FIGURE 3-1 MALMQUIST INDEX AND PRODUCTIVITY CHANGE, SOURCE (WORTHINGTON, 1999).....	161

FIGURE 3-2 TOTAL FACTOR PRODUCTIVITY CHANGE OVER YEARS OF DIFFERENT INCOME LEVELS COUNTRIES. ....	171
FIGURE 3-3 TOTAL FACTOR PRODUCTIVITY CHANGE OVER YEARS OF DIFFERENT REGIONS. ....	173
FIGURE 3-4 PRODUCTIVITY GROWTH AND EFFICIENCIES, CRISIS AND COUNTRY'S INCOME LEVEL. ....	183
FIGURE 4-1 REGIONAL / CONTINENT AND ANNUAL DISTRIBUTION OF BANK M&A ANNOUNCED AND COMPLETED DEALS BETWEEN 1999 AND 1ST QUARTER OF 2017. ALSO, THE REGIONAL DISTRIBUTION OF THE NUMBER OF BANK M&A DEALS OVER THE STRATEGIC ORIENTATION OF THE DEAL.....	229
FIGURE 4-2 SUMMARISES THE BEHAVIOUR OF RISK FACTORS AND THE STRATEGIC ORIENTATION OF BANK M&A DEALS AND THEIR BEHAVIOUR IN THE EFFECT OF TARGET FIS LINE OF BUSINESS. ....	230
FIGURE 4-3 RISK FACTORS AND TARGET FI'S LINE OF BUSINESS; UPON ANNOUNCEMENT AND 30 AND 120 DAYS AFTER THE ANNOUNCEMENT.....	243
FIGURE 4-4 RISK FACTORS BEHAVIOUR AND THE STRATEGIC ORIENTATION OF FIS M&A DEALS DURING THE 2008- 2011 FINANCIAL CRISIS. ....	260
FIGURE 4-5 AVERAGE SYSTEMIC RISK (UPON MERGERS ANNOUNCEMENT) BEHAVIOUR DURING THE FINANCIAL CRISIS; AVERAGE DIFFERENCES DEPENDING ON TARGET FIS BEING A DIVERSIFIED FI, AN INSURANCE COMPANY, INVESTMENT COMPANY OR A REAL ESTATE FIRM.....	267

# *List of Tables*

TABLE 2-1 BANK MERGERS DEALS' DESCRIPTIVE STATISTICS OF THE NUMBER OF DEALS, DEAL VALUE AND STRATEGIC ORIENTATION. ....	94
TABLE 2-2 FINANCIAL INSTITUTIONS' MERGERS DEAL ORIENTATION. ....	95
TABLE 2-3 ACCOUNTING/FINANCIAL AND EFFICIENCY AND CAPITAL PERFORMANCE VARIABLES; AND THEIR SOURCES, CODES AND THEIR FORMULAE OF CALCULATION. ....	105
TABLE 2-4 SUMMARY STATISTICS OF PERFORMANCE INDEPENDENT VARIABLES OF ACQUIRING FINANCIAL INSTITUTIONS. ....	107
TABLE 2-5 FINANCIAL INSTITUTIONS PERFORMANCE CHANGE FOLLOWING DIFFERENT TYPES OF MERGERS. ....	111
TABLE 2-6 SHORT HORIZON EVENT STUDY RESULTS; CUMULATIVE ABNORMAL RETURNS ALONG WITH PARAMETRIC AND NON-PARAMETRIC SIGNIFICANCE TESTS. ....	114
TABLE 2-7 LONG HORIZON EVENT STUDY RESULTS AND THE BUY AND HOLD ABNORMAL RETURNS CBHARS SEGREGATED OVER MERGER STRATEGIES. ....	116
TABLE 2-8 CARs AND BHARS VARIATIONS OVER MERGER ANNOUNCEMENT WINDOWS AND IF THE MERGER IS MEGA OR NOT. ....	118
TABLE 2-9 CARs AND BHARS VARIATIONS OVER MERGER ANNOUNCEMENT WINDOWS AND DEAL CURRENCY. ....	120
TABLE 2-10 CARs AND BHARS VARIATIONS OVER MERGER ANNOUNCEMENT WINDOWS AND DEAL PAYMENT METHODS. ....	122
TABLE 2-11 CARs AND BHARS VARIATIONS OVER MERGER ANNOUNCEMENT WINDOWS DURING, BEFORE AND AFTER THE 2008-2011 CRISIS. ....	122
TABLE 2-12 ROBUST REGRESSION; ABNORMAL RETURNS (CARs AND BHARS), MERGERS STRATEGY AND PRE-MERGER PERFORMANCE. ....	126
TABLE 2-13 ROBUST REGRESSION; ABNORMAL RETURNS (CARs AND BHARS), MERGERS GEOGRAPHIC ORIENTATION AND PRE-MERGER PERFORMANCE. ....	128
TABLE 2-14 ROBUST REGRESSION; ABNORMAL RETURNS (CARs AND BHARS), MERGERS STRATEGIC ORIENTATION AND MERGER YEAR PERFORMANCE. ....	131
TABLE 2-15 ROBUST REGRESSION; ABNORMAL RETURNS (CARs AND BHARS), MERGERS' STRATEGIC ORIENTATION AT INDUSTRY LEVEL AND MERGER YEAR PERFORMANCE. ....	134
TABLE 2-16 ROBUST REGRESSION; ABNORMAL RETURNS (CARs AND BHARS), MERGERS' STRATEGIC ORIENTATION AT INDUSTRY LEVEL AND POST-MERGER PERFORMANCE. ....	134

TABLE 2-17 ROBUST REGRESSION OF ECONOMIC VALUE ADDITION POST-MERGER OVER THE SHORT AND LONG HORIZONS ABNORMAL RETURNS AND FINANCIAL PERFORMANCE OF DIFFERENT ECONOMIC REGIONS. ....	138
TABLE 3-1 DESCRIPTIVE STATISTICS; 2,155 BANKS IN 94 COUNTRIES AND THEIR REGIONAL AND ECONOMIC AREAS DISTRIBUTION. ....	170
TABLE 3-2 TRUNCATED REGRESSION OF TOTAL FACTOR PRODUCTIVITY OVER REGULATORY, EFFICIENCY, FIRM AND MARKET VARIABLES. ....	175
TABLE 3-3 TOTAL FACTOR PRODUCTIVITY CHANGE, MARKET POWER AND BANK EFFICIENCIES. ....	176
TABLE 3-4 TOTAL FACTOR PRODUCTIVITY CHANGE WITH REGULATORY, REGIONAL DISTRIBUTION AND MACRO - ENVIRONMENT VARIABLES. ....	179
TABLE 3-5 TOTAL FACTOR PRODUCTIVITY CHANGE WITH REGULATORY VARIABLES, INCOME LEVEL SEGREGATION AND MACRO - ENVIRONMENT VARIABLES. ....	179
TABLE 3-6 EFFICIENCIES ASSOCIATION WITH REGULATORY AND MACRO-ENVIRONMENT VARIABLES CATEGORISED OVER COUNTRIES. ....	181
TABLE 3-7 FINANCIAL INSTITUTIONS' EFFICIENCIES ASSOCIATION WITH REGULATORY AND MACRO-ENVIRONMENT VARIABLES AROUND THE 2008-2011 FINANCIAL CRISIS. ....	185
TABLE 4-1 SUMMARY STATISTICS SHOWING THE NUMBER OF BANK MERGER DEALS DISTRIBUTION OVER YEARS, REGIONS, AND ANSOFF'S MATRIX CATEGORISATION OF DEAL ORIENTATIONS. ....	227
TABLE 4-2 DELTA BETA SUMMARY STATISTICS. ....	233
TABLE 4-3 THE EFFECT OF BANK M&AS ON BIDDING BANKS RISKS AND THE ASSOCIATION WITH THE REGULATORY, MARKET AND FIS FACTORS. ....	235
TABLE 4-4 BANK MERGERS AND CONGLOMERATION; SYSTEMATIC RISK AND LONG-RUN MARGINAL EXPECTED SHORTFALL. ....	241
TABLE 4-5 SYSTEMIC RISK VARIATIONS AND ITS CONTRIBUTING FACTORS; NORTH AMERICA VS WESTERN EUROPE. ...	245
TABLE 4-6 LOCAL AND CROSS BORDER FIS MERGERS EFFECT ON SYSTEMIC RISK AND THE ASSOCIATED FACTORS. ....	248
TABLE 4-7 THE EFFECT OF THE PRODUCT DIVERSIFICATION AND TARGET FINANCIAL INSTITUTIONS' LINE OF BUSINESS ON SYSTEMIC RISK CONTRIBUTIONS AND EXPLANATORY FACTORS. ....	251
TABLE 4-8 MAXIMUM LIKELIHOOD SHOWING THE ASSOCIATION OF SYSTEMIC RISK UPON MERGER ANNOUNCEMENT WITH DEAL CRITERIA AND CONTRIBUTORY FACTORS UNDER DIFFERENT TARGETS INSTITUTIONS TYPES. ....	254
TABLE 4-9 SUMMARY STATISTICS OF FIS MERGERS THAT ARE ANNOUNCED DURING THE 2008-2011 FINANCIAL CRISIS AND THEIR DISTRIBUTION OVER DEAL ORIENTATION. ....	258

TABLE 4-10 FACTORS (PRE- AND POST-MERGER) INFLUENCING SYSTEMIC RISK CHANGE FOR MERGERS TOOK PLACE IN THE YEARS 2008-2011 CRISIS.....	262
TABLE 4-11 THE 2008-2011 FINANCIAL CRISIS EFFECT ON SYSTEMIC RISK VARIATIONS AND THE ACCOMPANYING FACTORS.....	264
TABLE 4-12 COMPARATIVE ANALYSIS OF PERFORMANCE FACTORS EFFECT ON SYSTEMATIC RISK, SYSTEMIC RISK AND CAPITAL SHORTFALLS BETWEEN BIDDING BANKS AND TARGET FINANCIAL INSTITUTIONS. ....	270
TABLE 4-13 SYSTEMIC RISKS INSTRUMENTED BY DELTA BETA OVER DEAL VALUE, PAYMENT TYPE, REGULATORY FACTORS AND MARKET CONDITIONS.....	275
TABLE 4-14 DELTA SYSTEMIC RISK STRUCTURAL MODELLING OF ENDOGENOUS AND EXOGENOUS VARIABLES.....	279
TABLE 4-15 SRISK CONTRIBUTION ADJUSTMENT FOLLOWING A BANK MERGER ANNOUNCEMENT AND THE ROLE OF PAYMENT METHOD. ....	286

## *List of Abbreviations*

UK	The United Kingdom	GDP	Gross Domestic Production
US	The United States of America	GLM	Generalised Linear Model
AAR	Average Abnormal Returns	GNI	Gross National Income
ACTR	Activity Restrictions	GSA	Glass-Steagall Act, 1933
AR	Abnormal Returns	GSA	Generalised Sign
ASEAN	the ASEAN countries; Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam	IC	Invested Capital
BCBS	Bank Commission for Banking Supervision	IMF	International Monetary Fund
BCP	Basel Core Principles for Effective Bank Supervision	IT	Information Technology
BHAR	Buy and Hold Abnormal Returns	LI	Local Markets Indices
BHC	Bank Holding Companies	LRMES	Long Run Marginal Expected Shortfall
BHCA	Bank Holding Companies Act, 1956	LSDV	Least-Squares Dummy Variables
BICS	Bloomberg Industry Classification Systems	LTCM	Long-Term Capital Management
BMP	Boehmer, Musumeci and Poulsen; Boehmer et al. 1991 Test.	LVG	Quasi Leverage
BRICS	The countries of Brazil, Russia, India, China and South Africa	MBS	Mortgage Backed Securities
BWFINDL	Bloomberg World Financial Index	MENA	Middle East and North Africa
CAAR	Cumulative Average Abnormal Returns	MSCI	Morgan Stanley Capital International; index of stock market performance.
CAPM	Capital Asset Pricing Model	NOPAT	Net Operating Profits after Tax
CAPRQ	Capital Requirements	OLS	Ordinary Least Squares, regression
CAR	Cumulative Abnormal Returns	PECH	Pure Technical Efficiency Change
CDS	Credit Default Swaps	PESTEL	Political, Economic, Social, Technological, Environmental and Legal factors
CEE	Central and Eastern Europe	PMON	Market Discipline and Private Monitoring
CONC	Concentration	RegTech	Regulatory Technology
CoVaR	Conditional Value at Risk	ROA	Return on Assets
CRS	Constant Return to Scale	ROE	Return On Equity
DEA	Data Envelopment Analysis	ROIC	Return on Invested Capital
DFA	Dodd-Frank Act, 2010	SCAR	Standardised Cumulative Abnormal Returns
EBA	European Banking Authority	SECH	Scale Efficiency Change
EC	European Commission	SGR	Sustainability Growth Rate
ECB	European Central Bank	SIFI	Significantly Important Financial Institution
ECFR	Economic Freedom	SLR	Supplementary Leverage Ratio

EFFCH	Efficiency Change	SPR	Supervisory Power
EME	emerging market economies	SRISK	Systemic Risk
EVA	Economic Value Addition	TBTF	Too-Big-to-Fail
FCA	Financial Conduct Authority	TECHCH	Technological Change
FCIC	Financial Crisis Inquiry Commission	TFP	Total Factor Productivity
FDIC	Federal Deposit Insurance Corporation	TN	Trillion
FI	Financial Institution	USA	The United States of America
FII	Local Market Industry Indices	USD	US Dollars
FinTech	Financial Technology	VaR	Value at Risk
FnFrdm	Financial Freedom	VRS	Variable Return to Scale
FSAP	Financial Sector Assessment Program	WAAC	Weighted Average Cost of Capital
FSMA	Financial Services Modernisation Act, 1999		

# **1 Introduction and Literature Review**

## 1.1 Introduction

Although recent financial regulations (2012-2018) have limited, to a large extent, the concept of universal banking and conglomeration, financial institutions are still diversifying activities and geographies through mergers. Mergers are often perceived variously over their risk and return impact on financial institutions and sectors. The main differences are over the two hypotheses of “diversification stability” and “diversification fragility”. Enthusiasts of every theory pose a sheer of justifications to contend the opposing theory. Starting from regulation and its effect, return and value creation and systematic and systemic risks; at the macro- and micro-prudential determinants.

Financial Institutions, and banks at their core, merge in a natural portfolio management initiative of diversifying risks and returns. However, FIs mergers can lead to either;

- Enhance institutions’ and systems’ stability and resilience via higher income, enhanced efficiency, shareholders and firm value maximisation, balanced idiosyncratic risk and consequently systemic risk. Or,
- Can degrade stability and promote fragility through sponsoring regulatory arbitrage and endorsing lower returns and deficiencies and destroying share value and exacerbating systematic and systemic risks.

Recently, banks and financial institutions have witnessed a crisis that extended into an economic crunch at the global level. Between 2007 and 2011, governments bailed out several large banks to avoid a crash (others crashed). It started in a property bubble called the subprime crisis, which started in the US, but spread to many developed and developing economies. In August 2007 a seizure in the banking system precipitated by BNP Paribas announcing that it was terminating activity in three hedge funds that focused in US mortgage debt. A year later, in September 2008, the US government allowed the investment bank Lehman Brothers to go bankrupt, demolishing the notion

of "too big to fail" banks, with the result that every bank was supposed to be risky. Within a month, the hazard of a domino effect through the global financial system compelled western governments to infuse vast sums of capital into their banks to prevent collapse. At the London G20 summit on 2 April 2009, world leaders committed to a \$5tn (£3tn) fiscal expansion, an extra \$1.1tn of resources to help the International Monetary Fund and other global institutions boost jobs and growth, and to reform of the banks. From this point, when the global economy was on the turn, international co-operation started to crumble as countries pursued individual agendas (De Grauwe, 2010).

In May 2010, the focus of concern switched from the private sector to the public sector with Greece debt crisis. The IMF and the European Union planned financial help to Greece because the issue was no longer the solvency of banks but the solvency of governments. Budget deficits had expanded during the recession, mainly as a result of lower tax receipts and higher welfare spending, but also because of the fiscal packages announced in the winter of 2008-09. Greece had unique problems as it covered up the desperate state of its public finances and had difficulties in collecting taxes, but other countries started to become nervous about the size of their budget deficits (De Grauwe, 2010; Mody and Sandri, 2014). Austerity became the new slogan, affecting policy decisions in the UK, the eurozone and, most recently in the US, the country that stuck with an expansionary fiscal policy the longest.

The transforming of a private debt crisis into a sovereign debt crisis was complete by August 2011, when the rating agency S&P surprised Wall Street by announcing that America's debt would no longer be classed triple A. This could hardly have come at a worse time, and not just because last week saw the most significant sell-off in stock markets since late 2008 (Mody and Sandri, 2014). Legislators and policymakers are challenged with a slowing global economy and a systemic crisis in one of its significant connectedness components, Europe. In addition to the challenges that were pre 2008 crisis in the first place, the imbalances between the big creditor nations such as China and

Germany, and big debtors like the US and Western Europe (Affinito and Pozzolo, 2017; Turner, 2009).

The leading causes of the crisis and its rapid propagation were; **a)** property market bubble, **b)** massive securitisation through Mortgage-Backed Securities (MBS), **c)** interconnectedness of banks and financial institutions. This interconnectedness is portrayed in the interbank markets, but more fundamentally in the umbrella institutions that are “holding companies” conducting several financial activities from commercial banking to investment and securitisation to insurance. Such institutions have come to exist through a series of mergers adding a business line to another and exploiting the regulatory arbitrage, along with scaling up interconnectedness.

Ring-fencing and higher capital requirements as buffers, along with other Basel III pillars, were the theme of the 2008-2011 crisis aftermath regulation in the US, the UK and EU, and other regions (UK’s Financial Services Act (2013), US’s DoddFrank Act (2010), EU’s Liikanen report (2012)). However, in 2017, banks, and other financial institutions, started protesting the effects of these regulations on their profits and efficiencies. A bill passed the US Senate in 2018 has confirmed how disgruntled banks are forceful to allow to deduct cash held on behalf of clients from the calculation of the critical metric of Supplementary Leverage Ratio (SLR), which accounts for capital as a percentage of gross assets. Doing so would lower the amount of capital the banks need to meet the requirements of the SLR, allowing them to yield more cash to shareholders in the form of dividends and share buybacks. This relaxation would destabilise the long-term resilience of the banking system and the broader economy, too (Hoeing, 2018). Especially, considering the most recent episode of deregulation banks are engaging in mortgage-backed securities. Notably, the UK Barclays started in May 2019 bundling US home loans, which was the same demonised sector of securitisation for its role in the 2008 crash (White and Cruise, 2019). Henceforth, highlighting procyclicality of regulation and distress in the financial sector again.

Therefore, the main objective of this thesis is to investigate how financial institutions can expand and grow profitably and contribute to sector and economy stability, i.e. maximising return and wealth, but limiting risks. Financial Institutions, and banks specifically, can expand their growth through vertical or horizontal mergers. Hence, the Product and Market development matrix of (Ansoff, 1958) is used to map and analyse merger deals in the four strategic categories of market penetration, market development, product development and diversification. This thesis examines the outcomes of these strategies on the risks and returns of firms and markets on the relative merits of:

**a)** shareholders values in the immediate merger event windows.

**b)** shareholders value in longer windows extending to 40 to 100 trading days following the M&A announcement.

**c)** efficiencies, economic value and sustainable growth changes following the M&A announcement and the role of regulation.

**d)** capital shortfalls, systematic and systemic risks different adjustments to various types of FIs mergers.

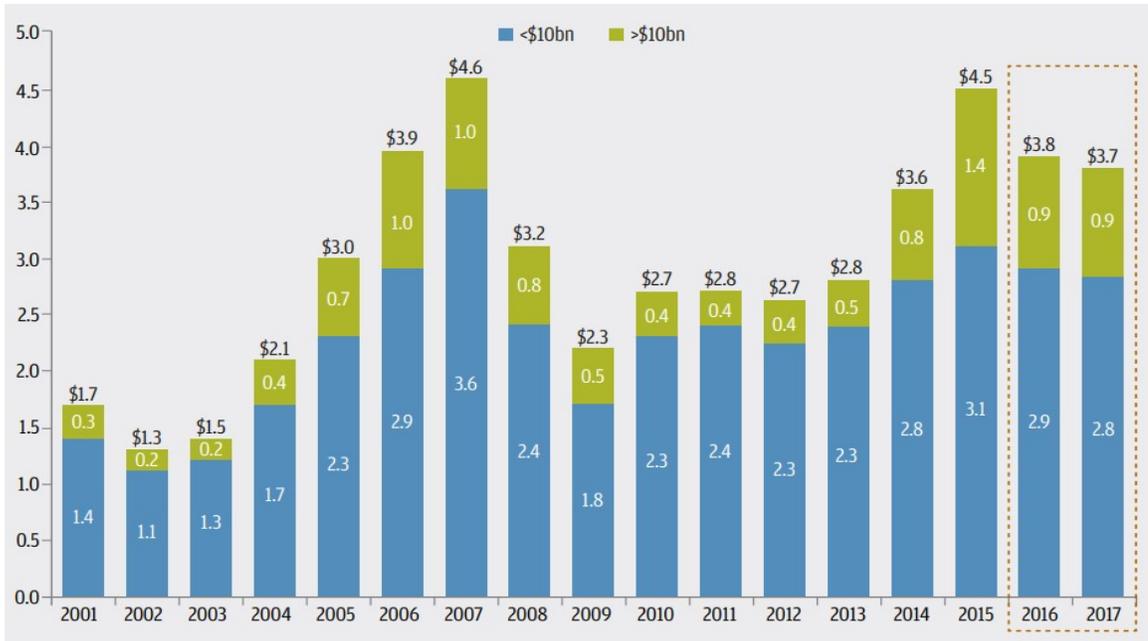
Mergers are one of the significant ways of corporate restructuring and consolidation, especially in financial services (Berger *et al.*, 1999). One of the significant factors behind an increase in mergers in the financial sector, and banks specifically, is the increased competition (Carletti *et al.*, 2007; Garmaise and Moskowitz, 2006; Rhoades, 1996). Successful institutions must increase their economies of scale to enhance their market coverage (Berger *et al.*, 1999; Houston and Ryngaert, 1994). Mergers assist organisations in increasing their competitiveness, enhance efficiency and boost their profitability.

Furthermore, governments often force banks and Financial Institutions (FIs) to consolidate-merge in a sector reshaping initiative to decrease the incidence of loan default and capital erosion. Mergers are, therefore, strategic tools that organisations and regulators use for reasons that are sector

and industry need or necessity and/or for systematic and idiosyncratic reasons for performance and risk averseness. The following literature section illustrates both motives of bank consolidations and their outcomes. This review is conducted in a synthetic style that reflects the regulatory background of bank consolidations, forms of merger and acquisitions and target FI industries. The literature also shows the theoretical framework and the global M&A layout and the results and the impact of regulation on banks and FIs performance and risk. The empirical chapters in this thesis follow the same theoretical layout by examining the effects of mergers on; banks efficiency and productivity in chapter two, shareholders value creation, economic value addition and sustainable growth in chapter three, and systematic and systemic risk and capital shortfalls in chapter four. Concluding remarks and recommendations are in chapter five.

## 1.2 The Global Landscape of M&A

Mergers and acquisitions have gained popularity as an expansion strategy for firms around the world. Following the series of economic shocks, banks in the UK and US are cutting down on their international operations and instead they are consolidating their financial systems to create more extensive and efficient organisations (Micu and Micu, 2016).



**Figure 1-1 Global M&A volumes 2001-2017 (US\$ TN) Source: Dealogic and JP Morgan.**

The global financial crisis forced companies all over the world to engage in different forms of strategic alliances for survival. By the end of 2017, the global M&A market revealed a strong position with a value of \$3.7 trillion as compared to \$3.8 trillion the previous year (J.P.Morgan, 2018). Therefore, the M&A sector has maintained its growth momentum as more companies adopted the strategy to access new markets and boost their market growth. However, the industry also faced several challenges, especially in cross-border arrangements. For instance, China implemented

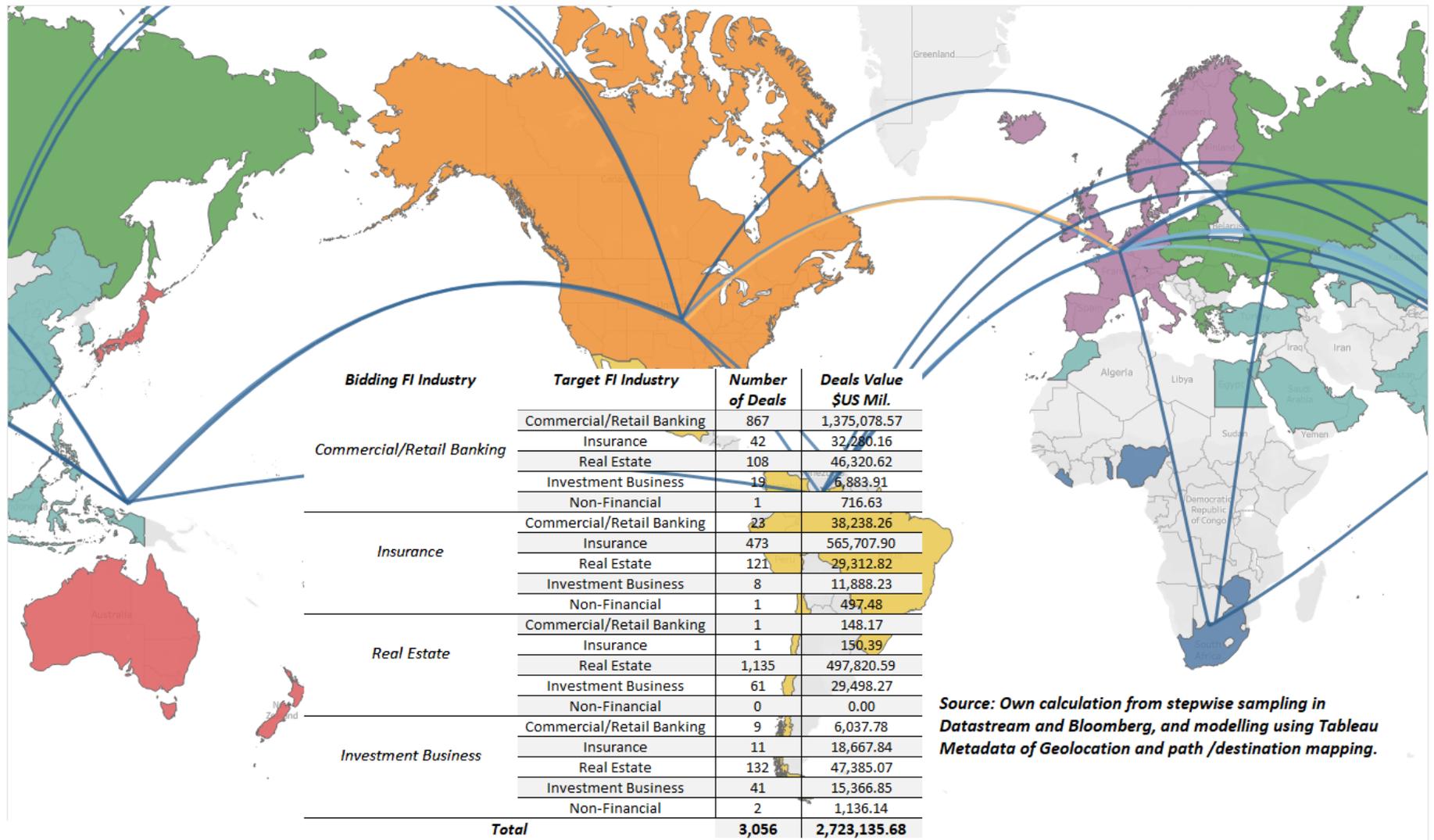
restrictive measures to limit outbound investment leading to a 32 per cent contraction in Chinese outbound M&A activity<sup>1</sup>.

The highest value of merger and acquisitions reached since 2003 was US\$ 4,960 billion in 2007. The steady growth accompanies the expansion in the use of technology in enhancing business efficiency. For example, the volume of mergers in the service and manufacturing sector increased due to political and economic stability in many countries. The volume of M&A weakened due to the effects of the 2008-2011 financial crisis. This meltdown disfigured the growth prospects of different sectors by reducing profitability and attractiveness to investors.

Most importantly, this crisis triggered a shifting landscape of global M&As in the banking sectors with banks from Latin America and Asia, acquiring incumbent US and European banks (Rao-Nicholson and Khan, 2017). As it stands, the present trends in the M&A of banks show that the Internationalisation of banking services has improved service delivery, despite facing several setbacks. Researchers attribute this trend to the brutal economic recessions and burdensome regulations imposed in the last two decades (De Haas and Van Lelyveld, 2014). **Figure 1.2** below shows the distribution of all financial institutions mergers numbers and values conditional to the target institution industry. It also shows the path/destination of these deals. Figures in the appendix show the same distribution of merger deals from and to every economic region identified in this thesis.

---

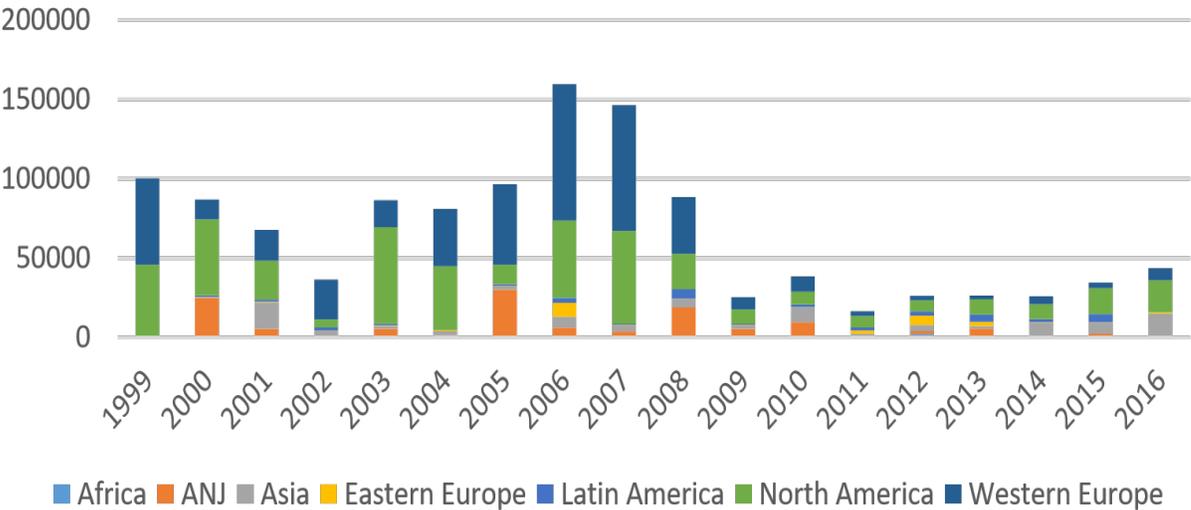
<sup>1</sup> Key takeaways from global M&A market: a) The global M&A market accounted to \$3.7 trillion in announced volumes, notwithstanding substantial global geopolitical uncertainty. b) Cross border transactions accounted for 30% of overall volume, meaningfully lower than 36% in 2016 and in line with 31% in 2015. c) Megadeals slow down: The number of \$10+ billion deals was down 5%, in part reflecting an uncertain regulatory environment. d) A number of highly strategic transactions occurred in 2017, as companies looked for opportunities to innovate core business models and mitigate technology disruption e) Material level of withdrawals: The volume of withdrawn deals in 2017 was \$658 billion, 23% lower than 2016 and 15% higher than 2015 volume, partly reflecting continued pressure from regulators. f) Leading sectors: Diversified industries was the most active sector by dollar volume in 2017, followed by technology, real estate and healthcare (J.P.Morgan, 2018).



*Source: Own calculation from stepwise sampling in Datastream and Bloomberg, and modelling using Tableau Metadata of Geolocation and path /destination mapping.*

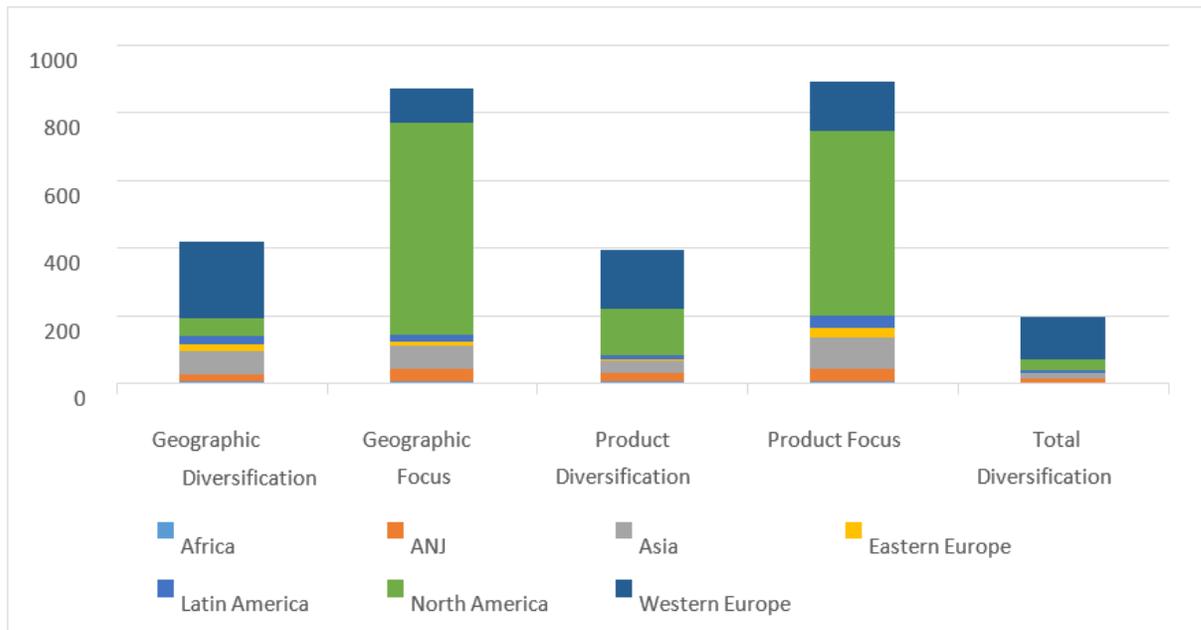
**Figure 1-2 Financial institutions; merger deal numbers and value of deals and their distribution by target institution industry.**

Figures 1.3 and 1.4 below analyse the distribution of bank mergers over the years between 1999 and 2018 and over the strategic orientation of deals.



**Figure 1-3 Bank Merger and Acquisition deal value (in USD Mil.) over regions and years from 1999 to 2017.**

Between 1999 and 2017 1236 bank merger and acquisition deals took place, with a value of \$USD 1.2 Trillion. The number of bank deals follows a steady increase from 1999 to mid-2007. Due to the financial crisis, by August 2007, bank M&As started a steep decline until the endings of 2011. The total number of deals that took place between August 2007 and August 2011 was 209 deals with a total value of \$USD 200 Billion.



**Figure 1-4 Distribution of Bank mergers deal numbers over deal type towards geographic and activity focus and diversification, and regions.**

Around 34% of these deals are cross-border (i.e. geographic diversification), while 70.3% are local deals (i.e. geographic focus). On the hand, 63.2% of bank M&As are product focus (i.e. the merger is between two banks), and 40.8% are product diversifying deals where banks merge or acquire an FI that is in the insurance, real estate, or investment industries. Around 14.7% of all deals are total diversification, where a bank acquires or merge with FI that is in the insurance, real estate, or investment industries but operates in a different jurisdiction than the acquiring bank. In Europe, the process of M&As in the banking sector has become rampant, given the introduction of the Euro and the creation of a single market for financial services in the early 1990s. For instance, the creation of the Monetary Union in the 1990s resulted in a subsequent increase in the number of M&As among banks in the region. In this region, however, the process of banking consolidation has not developed wholly, but it could continue to grow progressively. Several justifications could explain the optimism surrounding the growth of banking consolidations in the European region. For one, the concentration of banks in some European countries is still homogenous. Therefore, as these countries embrace the

economic integration championed in the region, so will the respective financial institutions. Second, the effects of factors such as financial globalisation and technological advancements will continue to persist; thereby, instigating European banks to consolidate. Finally, there is more room for consolidation in Europe than in other banking hubs such as the United States.

To enumerate, the number of banks per clients in Europe is twice as much as that in the United States (Altunbaş and Marqués, 2008). The landscape of bank M&As in Europe, as in the rest of the world, demonstrates unique risk management activities. One such example is the scenario whereby subsidiaries of parent banks undertake other foreign activities on their own. For instance, Nordea is a multinational bank comprising subsidiaries in countries such as Denmark, Russia, Norway, and Finland. Initially, Nordea stemmed from a more exceptional consolidation involving other banks such as Christiania Bank of Kreditkasse, Nordbanken, and Meritabanken. Recently, however, the Finnish subsidiary of Nordea has independently expanded its activities to other markets such as Lithuania, Latvia, and Estonia through local subsidiaries (De Haas and Van Lelyveld, 2014). This phenomenon demonstrates the un-conventional M&A practices adopted by banks to survive the turbulent banking industry.

Regardless of the takeover patterns, merger and acquisition activities are dependent on a host of dynamics. Risk-shifting incentives often drive regional mergers since the target firm may possess a higher capacity to help the acquirer overcome opposition in the existing or new market environment (Bagliano *et al.*, 2000b). For instance, a bank in the United Kingdom (UK) may want to acquire a financial institution in the Middle East. However, the regulator may restrict the companies from entering into merger safety nets without due diligence. To promote sustainable takeover, a UK bank should be able to acquire assets such as brand name, technology and human resources. These assets are crucial as they strategically put the interest of stakeholders first, hence, making most mergers an ongoing concern.

### 1.3 Literature review

Several theories explain the probable sources of gains following mergers and acquisitions. The most common theories identified in the current literature are *market development* and *power theory*, the *resource-based* theory and diversification theory. Henceforth, financial institutions merge to empower firms with faster means to access new markets, expand their product and consumer markets internationally, overcome trade barriers and increase firm value. Several studies prove that market power is a source of value for acquiring firms (Campa and Hernando, 2004; Du and Boateng, 2015; Goddard *et al.*, 2012b; Huljak, 2015; Lerskullawat, 2017). Second, the resource-based view literature suggests that gaining access to strategic assets, such as clientele base, investors, product differentiation, technologies, and superior managerial and marketing skills are all motives for financial institutions M&As, national and crossborder. Acquiring these capabilities and resources promotes technological learning, facilitates the development of skills and competencies, improves economies of scale and consequently increases, offset competitive weaknesses and increase firm value (Barney, 1991; Goetz, 2012; Nisar *et al.*, 2018; Pasiouras, 2008c; Pinto and Sobreira, 2010; Tsagkanos, 2010).

Further, Financial Institutions, and banks', mergers allow firms the opportunity to reduce costs and risks when entering new foreign markets (Campa and Hernando, 2004; Du and Boateng, 2015; Seth, 1990). Diversification as a source of value comes from exchange rate differences and the ability to lower the cost of debt and reduce variance in the cash flows when the cash flows of acquirers and targets are less correlated (Bhagat *et al.*, 2011; Goetz, 2012; Kashyap *et al.*, 2017; Morck *et al.*, 1998). The last two theories present the main paradigms of "diversification stability" as a motivation for mergers, as it becomes achieved through **1)** enhanced efficiency, scale and scope and capabilities, **2)** firm value and shareholders wealth maximisation and **3)** less correlated sources of income and diversified idiosyncratic and systemic risk.

### **1.3.1 Mergers examination; a theoretical framework**

This thesis investigates these paradigms of risk and return analysis following the institutional theory, because it helps explore firms (Banks and FIs) behaviour in different geographic markets, at various timely manners (Time series or panels of data) and that have many deals criteria and follows various styles of vertical and horizontal mergers and acquisitions. In addition to capturing the influence of market factors. This theory fits the purpose of this investigation because it examines M&A involved Financial Institutions at different windows of the merger, influenced by several internal and external factors of strategies, operations and regulatory frameworks, using time-varying financial accounting measures and estimations of risks and returns.

During the past decade, the institutional theory emerged as a significant approach to describe the behaviour of firms (Buckley *et al.*, 2007; Child and Rodrigues, 2015; Hoskisson *et al.*, 2000). The theory suggests that institutional contexts (i.e., the combination of formal rules, informal constraints and their enforcement characteristics) create the impetus for action patterns in an organisation. Three pillars of the institutional framework are identified: the regulatory framework (laws and rules governing FIs and banks), the cognitive conception (widely shared cultural knowledge and social perceptions), and the normative conception (social norms, values, and culture) (Scott, 2002). Applied to research in management, financial-economic management, the institution-based view postulates that firms are shaped by the home and host countries' institutional environments (Hoffman and Ventresca, 2002; Scott, 2008). When constructing and implementing strategies, firms require legitimacy in addition to economic efficiency to survive, succeed and make strategic choices. This practice materialises through their interactions with institutions at broader influences than firm- and industry- level factors such as support from the state and society transcribed in regulation, clients and investors (Ketteni and Kottaridi, 2019; Peng *et al.*, 2009; Peng *et al.*, 2008; Sutanto and Sudarsono, 2018).

Considering the above discussion, the following framework (Fig. 1.5) is pursued to analyse the effects of mergers and acquisitions and regulatory and institutional variables on returns, value, efficiency and risks in a global dataset of acquiring and target banks and financial institutions.

### **1.3.2 Thesis Outline**

Therefore, this research highlights the literature gaps and answers the following questions:

- How Bank Regulations impact bank performance?
- On the relative merits of risk and return, what strategy is best for bank mergers; diversification or focus or a mixture of these over activities and geographies?
- Which mergers can be equally beneficial at the systematic and systemic levels?

These questions are theoretically analysed and empirically investigated in the remainder of this study. Chapter 2 delves in a piece of international evidence to support arguments with, or against, the fact that financial institutions merger can maximise wealth for shareholders and the firm through share value and economic value. Chapter 3 examines the impact of regulations mapped in Basel II, Basel III and the 2007 financial crisis corrective measures in years 2013-2017 on financial institutions' and banks' productivity efficiency and sustainable growth. Chapter 4 investigates the influence financial institutions mergers, and banks specifically, have on initiating and/or propagating risk. Namely, FIs idiosyncratic risks of beta and individual capital shortfalls and systemic risks (SRISK) and collective capital shortfall. Chapter 5 consolidates the results of empirical chapters and discusses them to conclude and summarise the main findings and contributions. The application and implications of these results in the relevant financial sector and its industries of insurance, commercial and investment banking, and property- real estate are also discussed. Policy implications and venue for future research are presented.

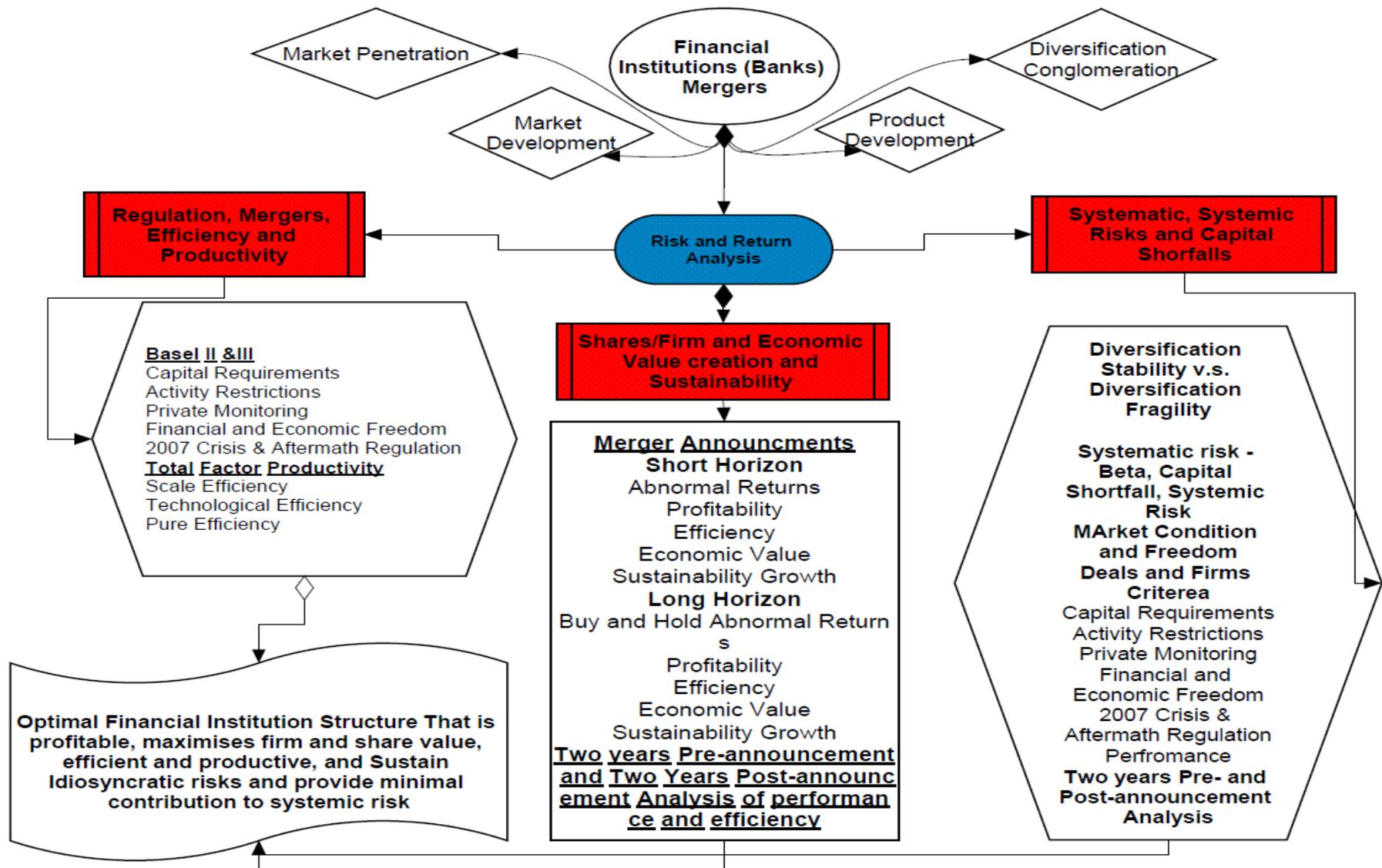


Figure 1-5 Theoretical Framework of analysing the effects of financial institutions and bank mergers on risk and returns.

### **1.3.3 Bank regulation; recent rumbles and procyclicality**

Financial institutions mergers and acquisitions activities have renewed interest in the necessity of government intervention. The US government emphasises responsible and accurate reporting of the financial performance of banking and investment institutions (Demyanyk *et al.*, 2007b). This renewed interest in the regulation of financial organisations arose from the Government's past negligence. For instance, the Government applauded Countrywide Financial before its fall in 2008 for granting low-income individuals an opportunity to own homes under the Equal Credit Opportunity Act of 1974. However, this Act was purely political with less regard to the economic consequences (Ferrell and Fraedrich, 2015).

Additionally, the government failed in its oversight of financial reporting according to the Sarbanes-Oxley Act (Sarbanes, 2002). As a result, many business organisations provided inaccurate reports that misled the market (Rating agencies). Moreover, the US government approached the crisis reactively instead of establishing corrective measures early enough. Thus, the lack of regulations and the failure to adhere to existing laws are a cost to the Government. In July 2010, President Barack Obama signed the Dodd-Frank Wall Street Reform and Consumer Protection Act (2010) to strengthen financial regulation and avert economic disasters in the future. The Act covers a variety of issues ranging from the oversight of Wall Street activity to reforms in the Federal Reserve. Due to its comprehensive nature, the Act protects the consumer from all forms of unethical practices of financial

institutions<sup>2</sup>. The Dodd-Frank law prohibits banks from speculating with customers' money and binds them to a regular disclosure of financial accounts.

The banking industry is an essential component of the global economy as it ensures there is a favourable circulation of money. According to Deli and Hasan (2017a), regulatory strategies should help banks increase profits and adaptation features. The regulators should provide oversight by evaluating market signals that emanate from ineffective fiscal policies and unhealthy risk-shifting. In many countries, the regulatory framework between 1930 and 2015 achieved various goals; such as prohibiting banks, from engaging in illegal banking activities. It also enforced that banks were insured from inherent and other external risks.

The goal of regulations is to minimise banks risk-taking; regulation aims to ensure that banks manage their risk-taking prudently and strike an appropriate balance between the pursuit of returns and the acceptance of risk. The Lending Act of 1968 in the United States was created to help authorities to protect customers from imbalanced credit practices (Pasiouras, 2008a). During this time, several constitutional bodies were formed to provide insurance services to depositors from incurring losses, for example, FDIC (Federal Deposit Insurance Corporation) in the United States (Cartwright, 2009). These agencies are mandated to ensure that financial institutions comply with regulations imposed to control the conduct of workers and other parties doing business together.

As the demand for banking increased, more regulations came into effect between 1990 to 2000. These regulations were to improve the disclosure of information among banks. According to Barth *et*

---

<sup>2</sup> For instance, it creates a credit rating function that oversees credit-rating firms such as Standard & Poor's to ensure they provide accurate evaluations. Additionally, the Act safeguards public access to privileged information such as Hedge Funds and Derivatives, and therefore, increases public awareness of the financial system.

*al.* (2008f), the evolution witnessed in the global banking industry during this time was alarming, as it weakened individuals' ability to access financing. Regulators addressed these changes by controlling the activities that transfer wealth from one institution to the another (Merrouche and Nier, 2017). For instance, banks in South East Asia operated in an environment free from government intervention. As a result, there was a need to develop regulations that would promote discipline in the banking sector. The effects of inherent instability in some economies have played a role in the development of regulatory era in the banking industry. Some of the most significant depressions in the world economy increased hostility in business environments. In response to this situation, regulations have been created to make mergers or investments in banks more lucrative. The integrity of the financial institutions should be maintained at all costs as it brings harmony to other business segments. This requirement is genuinely addressed by numerous regulations to enhance governance and conduct since some banks were accused of taking part in committing economic crimes such as corruption and defrauding business owners (Hardouin, 2009).

In the last decade, political activities have had significant impacts on the global economy. In July 2010, President Barrack Obama signed the Dodd-Frank Wall Street Reform and Consumer Protection Act to strengthen financial regulation and avert economic disasters in the future (Demyanyk *et al.*, 2007b). The Act covers a variety of issues ranging from the oversight of Wall Street activity to reforms in the Federal Reserve. Due to its comprehensive nature, the Act protects the consumer from all forms of unethical practices of financial institutions (Barth *et al.*, 2004). For instance, it creates a credit rating function that oversees credit rating firms such as Standard & Poor's to ensure that they provide accurate evaluations. The referendum held of 2016 in the United Kingdom posed severe challenges to the UK banking sector. This move was followed by a recession which was characterised by a polarization of the Britain economy (Papadia, 2018). The living standards in the

country rose, while people remained unsure about the future of their investments in financial assets. Therefore, several laws are usually enacted to safeguard the public against the harmful effects of political decisions (Moshirian, 2012).

Additionally, the existing regulations seek to help consumers access privileged information concerning assets such as hedge funds and derivatives. The increased public awareness seeks to prevent customer exploitation, which refers to the lack of adequate financial information. For example, the Dodd-Frank law prohibits banks from investing customers' money without their consent.

The renewed interests of M&A activities in the banking sector have appealed government intervention. In the United Kingdom, the government has been emphasising on responsible and accurate reporting of financial information by financial institutions. A series of studies indicate that the government's failure to foresee some of the challenges that faced the banking sector has resulted in increased regulations. During the 2008-2011 financial crisis, many low-income earners were defrauded by companies linked to banks, through the mortgage application mechanism and the proceedings of their risk rating and securitisation<sup>3</sup>. The regulations formed between this period aimed at reducing fraud and treachery in the financial sector. The next frontier of regulations in the banking

---

<sup>3</sup> Securitisation is the process whereby individual bank loans and other financial assets are bundled together into tradable securities, which are sold onto the secondary market. In the United States the market for Assets Backed Securities (ABS) started to develop by means of government-sponsored agencies (such as the Federal National Mortgage Association, known as Fannie Mae, and the Federal Home Loan Mortgage Corporation or Freddie Mac), which enhanced mortgage loan liquidity by issuing and guaranteeing, but not originating, ABS. These agencies contributed to the progressive growth in the outstanding volume of US agency mortgage-backed securities to USD 4 trillion at the end of 2006. Including both agency and non-agency issues the US market for mortgage-related securities accounted for over USD 6.5 trillion in this period, representing the largest segment of the fixed-income market in the world (to give an idea of the magnitude, the US corporate bond market accounted for USD 5.4 trillion, while the Treasury segment amounted to USD 4.3 trillion) (Altunbas *et al.*, 2009).

sector address issues relating to risks and overall strength of banks (Altunbas *et al.*, 2018; Hugonnier and Morellec, 2017; Laeven and Levine, 2009; Rosen, 2018). The use of sophisticated technologies by players in the banking industry adds business risks, thereby attracting additional government interventions and controls.

#### **1.3.4 “Economy-Regulatory” Cycles and Strategic Choices**

Bank regulation influences the market for corporate control and geographic presence or diversification, and activities in which banks can engage (DeLong, 2001b; Morck *et al.*, 1990). Cornett *et al.* (2003) argue that; bank mergers that are comparatively highly regulated tend to be non-value-maximising for bidders, contrary to intrastate bank mergers that are subject to few or no restrictions. Furthermore, banks and their targets locations in an M&A deal impacts their market control alongside their assets; because the regulation in its area greatly influences a bank's loan portfolio, given that some countries (states in the USA) allow banks to engage in underwriting securities, or conduct insurance or real estate contracts while others ban such activities. Therefore, different regulatory environments, along with profit maximisation motives, influence business decisions making and their process, especially around significant transitions like mergers and acquisitions. Hence, with banks, it is still not clear whether focusing (geography and/or activity) is a matter of choice or regulation. Thus, the bank mergers and regulation literature continues to provide divided views on the effects of regulation on bank performance and behaviour (Hoose, 2010). Barth *et al.* (2004) conclude that higher capital requirements have no significant impact on banking sector development. Ayadi *et al.* (2016b) also indicate that compliance with Basel Core Principles for Effective Bank Supervision has no association with bank efficiency. However, Brun *et al.* (2013) argue that a one percentage point increase in capital requirements leads to a reduction in lending by approximately 10% for French banks between 2008 and 2011.

The banking sector significantly differs from other industries because banks operate in a highly sensitive environment (Pinto and Sobreira, 2010). Additionally, the banking sector is responsible for financial resource allocation, which affects all other segments of the economy. Therefore, a crisis in the banking sector can cause critical reactions throughout the economy. The world has seen several banking crises, some being more serious than others. The first recorded banking crisis occurred in 1763 in Amsterdam with the collapse of Johann Ernst Gotzkowsky and Leendert Pieter de Neufville (Pinto and Sobreira, 2010). Later on, from 1772 to 1797, many banks experienced similar hardships in the UK and the United States. Other crises include the great panic of 1825 in the UK and the US recession, which occurred in 1901. The 20<sup>th</sup> century has also witnessed its fair share of economic hardships caused by or from the financial and banking crisis. From the Wall Street crash in 1929, the accompanying great recession and the bank run in 1931, to a currency crisis in Europe, because of the failure of the Exchange Rate Mechanism in 1992–93. 1997–98 in Asia and the Latin American countries default on debt in the early 1980s. The Japanese asset price bubble from 1986 to 1991, which was caused by inflation in real estate and stock prices and the 1998 Russian financial crisis. The latest was the 2008-2011 global financial crisis that started with the real estate bubble burst in the USA and propagated to banks and other industries through the securitisation process and its insurance coverage and from there to the rest of the economy and the world through the interconnectedness of the banking industry and its significance in the funds allocation process.

Traditionally, regulators and governments respond by increasing regulation and oversight of the banking sector. The rationale behind the regulation is that the sector has some structural weaknesses that could not be rectified by market forces and, thus, required external intervention (Affinito and Pozzolo, 2017). For instance, most banks create loans through the process of fractional

banking<sup>4</sup>. Thus, the system works because investors act in good faith. However, there are instances where this structure had failed when customers placed claims that banks were not able to honour. This situation has led to many waves of panic and severely affected the reputation of banks, motivating stricter regulation on reserves required to ensure liquidity. Secondly, the banking sector operates under a complex inter-bank system. This interdependency could cause a market collapse since liquidity problems in one bank may affect others within the value chain. As a case in point, the collapse of Lehman Brothers in September 2008 triggered a significant reduction in bank interconnectedness in the Italian market as banks began to move away from centrally connected institutions to avoid the diffusion of liquidity crises. The aftermath of the Lehman crisis saw an increase in unemployment by 10 per cent, the retrenchment of an estimated 6 million workers and a drop of the Dow Jones Industrial Average by 5000 points. The US government responded by implementing the Dodd-Frank Act (2010) for tighter control over wall street activities and the protection of investors from various forms of unethical practices by financial institutions.

However, scholars continue to disagree on the effects of government regulations on banking activities. Regulation and performance are differing concepts. Ayadi *et al.* (2016b) argue that there is no evidence to show how regulation affects the performance of banking institutions. Evidence also suggests that banking regulations, such as capital requirements, cannot improve the stability or efficiency of banks (Barth *et al.*, 2008e). These debates have spurred the banking sector into developing an array of innovations to minimise the impacts of regulation on the efficiency of banks. Following the 2008-2011 financial crisis, banks started to fear the impact of increased capital

---

<sup>4</sup> They essentially offer the public obligations which have no need to be honoured because they promise the delivery of value which is not necessarily within their power to give.

requirements on their ability and funds available for other profitable conducts. That is the worry of procyclicality in having the stability and resilience of banks sought through re-occurring regulation being adversely affected through draining out banks of their most needed funds at the bottom of the credit cycle and leading them to innovation that drives de-regulation (Dancer and Powell, 2018). Considering the renewing debate over the cost of the 2008 crisis aftermath re-regulation, and how the new regulatory asset thresholds change the banking industry<sup>5</sup> (the 2010 Dodd-Frank Act for the USA, the 2013 Financial Services Act for the UK, and the 2012 Liikanen Report guidelines for Europe). Henceforth, re-emphasising the regulatory-performance dialectic (Kane, 1977, 1981b) and motivating research into the impact of renewed regulations on bank performance.

### **1.3.5 Mergers and innovation**

Financial Institutions and banks adopt innovation to sidestep restrictions that they perceive as disruptive to organisational efficiency (Calomiris, 2009b). In response to the additional capital requirements that accompanied Basel II, most banks engaged in **the securitisation of loans**, which involves booking assets off the balance sheets. Securitisation can be, broadly, as the process whereby individual bank loans and other financial assets are bundled together into tradable securities<sup>6</sup>, which

---

<sup>5</sup> One of the key features of the Dodd-Frank Act is that it imposes specific and costly regulatory requirements on banks that cross the threshold of having more than \$US 10 billion in total assets. This threshold has led to increased consolidation in the banking industry. Banks that approach the \$US 10 billion threshold are significantly more likely to engage in an acquisition, pay more for that acquisition, and acquire bigger target banks than similar banking institutions did prior to Dodd-Frank. Increasing the concern of diversified consolidations and its expected risk (Nicoletti *et al.*, 2018).

<sup>6</sup> In contrast to the US experience, the development of the securitisation market in the euro area started much later and was not triggered by the introduction of any specific government agency. The growth in euro-denominated securitisation started at the end of the 1990s, accelerated strongly from 2004 to late 2007 and declined afterwards. Securitisation activity in the euro area has also been large in terms of total credit granted (In 2006 the annual net flow of ABS issuance was near one fifth of bank loans granted to households and non-financial corporations during that year) (Shin, 2009; Carpenter and Murphy, 2010; Agostino and Mazzuca, 2011).

are sold onto the secondary market (Altunbas *et al.*, 2009). Hence prompting it to be an arbitrage strategy where banks simultaneously purchase and sell assets to profit from the difference enabling banks to maintain lower equity capital against the loans (Calomiris, 2009b). This mechanism was heavily utilised, and overused, before the 2008 financial crisis, through what is known as Mortgage-backed Securitisation (MBS). Which was, in essence, the root cause of the overly propagated financial crisis following the real estate bubble burst. That is because of the nature of the newly issued securities being off-balance sheets, hence capital requirement obligations are overtaken, and having a large scale of “virtual” trading in several transactions the same asset at risk. The default in the insurance sector has followed because these MBS were insured, and the sharp decline in value triggered mass default that was difficult to be managed by insurance companies. Hence, the critics of regulation have also castigated the capital requirements for causing the subprime crisis. Investment banks were perpetrators of the financial disaster due to their business practices. These organisations ventured into the risky subprime lending in 1992 without a proper assessment of the economic trends of the country (Ferrell and Fraedrich, 2015). The gains of this low-interest facility disappeared when the US economy began to stagnate in early 2000. Additionally, these institutions failed to place restrictions on the subprime loan facility and allowed all borrowers to qualify for lending, thus, increasing the risks in case of default.

Furthermore, the organisations pushed for subprime lending at the expense of other loan facilities, thus, increasing the volume of high-risk debt across the country. The subprime crisis was, therefore, a financial innovation gone wrong. However, some governments have implemented several deregulation initiatives to allow the banking sector to be more innovative, in venues like securitisation (MBS), permitting branching (intrastate in the US and intracontinental and cross border in Europe and Asia and Latin America), and activity diversification and conglomeration of umbrella banks with

insurance, investment and real estate arms. This relaxation of rules led to deregulation followed by the 2008 financial crisis trailed by waves of re-regulation.

**1.3.5.1 Diversification versus focus**

The global financial integration is usually a key contributor or resultant of global financial crises. This phenomenon has triggered the fragmentation of the financial markets in regions such as the Euro area and the collapse of the cross-border bank flows globally (Claessens and Van Horen, 2015). Key to this scenario has been the changing banking regulation and deregulation landscape coupled with the increased emphasis on strategic choices such as mergers and acquisitions. As mentioned earlier, banking institutions operate in a highly dynamic environment which requires strategic planning. Most of the factors that affect the banking sector are in a state of flux. For instance, the competitive environment keeps changing as more banks enter the market.

MARKETS PRODUCT LINE	$\mu_0$	$\mu_1$	$\mu_2$ .....	$\mu_m$
$\pi_0$	MARKET Penetration	MARKET DEVELOPMENT		
$\pi_1$	PRODUCT DEVELOPMENT			
$\pi_2$		DIVERSIFICATION		
.....				
$\pi_x$				

*Figure 1-6 Product-Market Strategies - Ansoff (1958).*

Financial institutions, therefore, require a framework that forecasts not only possible changes but also provides strategic options to maintain a competitive edge. The Ansoff matrix is a tool that provides strategic options in a dynamic environment. The framework provides the following strategic alternatives:

### **1.3.5.1.1 Market Penetration**

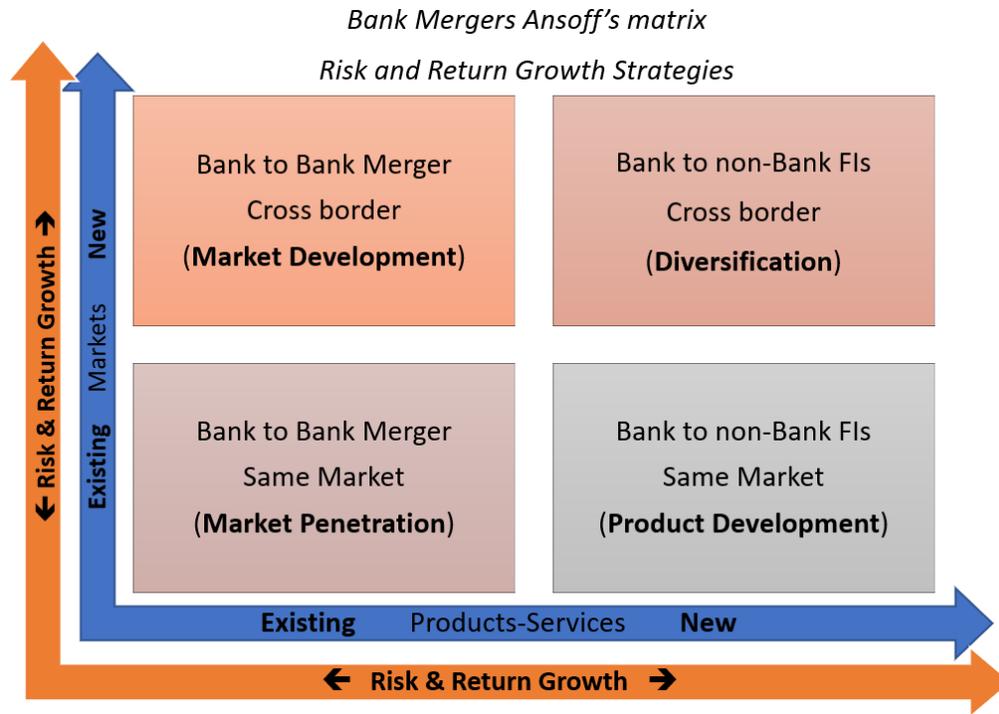
The market growth (*Market Penetration*) strategy is most appropriate for a firm selling existing products in the current market. Operating in the same market without any product innovations can expose an organisation to intense competition. However, this strategy assumes that the firm has not fully exploited the current market opportunities and, therefore, still has room for further expansion. Mergers and acquisitions (M&As) are an example of market growth strategies that can assist in reducing the threat of competition and increase shareholder wealth. The primary advantage of this strategy is that the company can draw significant returns by staying in its home territory. However, if the market gets saturated, the firm will suffer decreasing returns in its operations. **Market penetration** comprises other dimensions of the Ansoff matrix that could apply to the context of banking and financial markets. Market penetration is the primary pathway through which firms seek new markets to increase the sales associated with existing products, while diversification is the creation of a new customer base using an existing product. Casu *et al.* (2004b) argue that profit-making orientation helps banks to achieve market dominance through market penetration. However, market penetration presents a complex and far-reaching effect for consolidated banks during economic cycles. In studies evaluating the operations of multinational banks during the financial crisis, De Haas and Van Lelyveld (2014) found that foreign banks that followed this strategy were able to avoid the risks of the crisis by retreating from these markets. For domestic banks, however, the penetration of domestic banks is detrimental because it results in lowered credit growth. Banking systems relying on massive proportions of foreign shares of banking assets, including Slovenia's (24%) and Estonia's (96%) witnessed inhibited credit growth during the period. For instance, the credit growth of Estonia's banking system reduced from 34% to 4% from 2007-2009 alone. Similarly, the credit growth of Slovenia's credit system reduced from 33% in 2007 to 3% in 2009. Therefore,

the effects of market penetration on cross-border consolidated banks vary depending on the ownership designation.

### **1.3.5.1.2 Market development**

The market development strategy involves entry into a new market while maintaining an existing product. Again, M&As are appropriate strategies for entrance into a new market. Market development is valuable chiefly to organisations that wish to enter the international market without the challenges of presenting a new product (Delis *et al.*, 2011b). A study of the Florida Credit Union League revealed that the market development strategy had a higher impact on the Returns on Investment (Pleshko and Heiens, 2008). However, the firm will be operating in a relatively new market and, thus, requires adequate market information for success. Beyond product development, the current literature also points to the importance of **market development** as another strategic choice that banks could adopt in new and existing markets. Market development constitutes an initiative undertaken by firms to identify new markets for existing products once they attain maturity in the existing market (Hussain *et al.*, 2013). In the banking industry, market development paves the way for innovation efficiency. In studying the effects of capital market development in five ASEAN countries, Lerskullawat (2017) found that the development of the capital market strengthened the lending channel and vice versa. Torres and Zeidan (2016) argue that; market development sustained by national development banks in Brazil is vital in developing human capital and responding to the financial crisis in the industry. In a study of market power of banks operating in Central and Eastern Europe (CEE) countries, Huljak (2015) found entities with more market power are more likely to maintain their stability during times of economic crisis in comparison to banks with a low market share. The influence of market development could also explain why Western European banks

operating in the CEE region did not retrench or exit the market following the credit crunch experienced in 2008 in the region (Epstein, 2014).



*Figure 1-7 Ansoff's Matrix of Product-Market strategies versus perceived Risks and Returns. Adapted Ansoff's (1958) Matrix.*

### **1.3.5.1.3 Product development**

A strategy of organisations desiring to sell new products in an existing market. This strategy is closely similar to market development in that the organisation will be exploring a new idea. However, it will also be operating in a familiar environment. The firm must also spend significant resources on research and development to produce commodities that fit the market demand. In **product development**, firms engage in holistic efforts aimed at conceiving, designing, and marketing new products. It seeks to improve the performance of a firm's mission by pursuing products with different characteristics. Empirical evidence has shown that this aspect of the Ansoff matrix can indeed explain

the different strategic options undertaken by banks to expand to new markets. For instance, banks have been securing dominance in the market by embarking on activities aimed at crafting new products in a bid to gain a competitive advantage in the industry (Bagliano *et al.*, 2000b). Martovoy and Mention (2016) examined the patterns of new service development—a generic equivalent of product development, in the banking industry in Luxembourg. The findings revealed that this dimension is crucial for fast-tracking innovation of financial services in respective banks. Yordanova (2013) also found that an intense focus on processes, customer requirements, and bank products in the Bulgarian banking industry have led to the release of innovative bank products in the market. The UK banking sector has witnessed various product developments such as savings and mortgage products, mostly attributable to the changes experienced in the regulatory environment (Slattery and Nellis, 2005).

#### ***1.3.5.1.4* Diversification**

Diversification is the riskiest growth strategy because it involves selling a new product in a new market. Concentric diversification occurs when a company engages in new but related commodities while conglomerate diversification involves venturing into entirely new concepts that are unrelated to an organisation's specialities. Banks could use M&A strategies to implement all the four strategy classifications. Evidence from the financial sector seems to concur that Ansoff strategies are effective in ensuring superior performance (Pleshko and Heiens, 2008). **Diversification** is the final component of the Ansoff matrix. According to Ansoff (1958), diversification requires firms to simultaneously move away from the present market structure and product line. In a panel analysis of 200 commercial banks in South Asian countries, Nisar *et al.* (2018) found that banks, which diversity into specific forms of income-generating activities are not dependent on interest are likely to access different sources of revenue. Perhaps most notably is the fact that diversification plays an essential role for

banks during times of economic downtimes. For instance, Gennaioli *et al.* (2018) found that European banks that had diversified during the recent financial crisis were more likely to maintain their profitability in comparison to institutions that did not. Against this backdrop, the following section provides a global view of the M&A landscapes in the banking industry.

Moussetis (2011) concludes that the Ansoff matrix was comprehensive and had a broad application across firms in the banking sector. The Ansoff strategies can also arise as a response to government regulation. Neale *et al.* (2010), conducted a study on the effects of the Financial Services Modernization Act of 1999 on the strategies of financial institutions and found out that most banks responded through a diversification strategy. Evidence from a cross-section of US commercial banks also revealed that these institutions implemented diversification as a way of managing financial risks (Goetz, 2012). The popularity of diversification among US banks was due to the deregulation policies implemented, which allowed more freedom for banks to implement financial innovations.

### **1.3.6 Hypotheses and Research Questions**

Recently, bank mergers and acquisitions attract significant attention at a time of growing supervision and regulation of financial institutions mainly attributable to the global financial crisis witnessed in the past decade (Cihak *et al.*, 2013b). Barth *et al.* (2008e) opine that fragility caused by these challenges has increased the demand for mergers or coordination between financial institutions. Institutions from various countries have acknowledged the growing significance of regulatory reform to support their efforts in joining forces to address financial challenges in the market. With the economic crisis not still entirely over yet, the debate surrounding the economic and regulatory cycles is still ongoing (Cihak *et al.*, 2013b). For instance, countries that experienced the crisis had less strict regulations concerning the treatment of losses associated with loans and bad loans. It is also interesting to note that countries with low capital ratios and more complex definitions of capital were

more susceptible to the recent economic crisis. Moreover, countries in crisis were those that imposed no or few regulations on non-bank activities including but not limited to real estate, insurance, and investment banking. Finally, countries with more lenient banking regulations as relates to compensation schemes, equity, and provisions were highly susceptible to the economic crisis (Ayuso *et al.*, 2004; Laeven and Levine, 2009).

These scenarios collectively point to an economic crisis attributable primarily to the vicious cycle of financial deregulation. This view would suggest that the global economic crisis coupled with other factors unique to the banking industry such as the technological change and competitive forces has prompted concerned stakeholders to impose necessary restrictions and supervisions for the betterment of the industry and the economy in its entirety. Such restrictions and supervisions are consistent with pillar three of the Basel II Accord Barth *et al.* (2004). However, growing empirical evidence has shown that intensified restrictions, particularly on non-lending activities, have been detrimental to the banking system through reduced efficiency of financial intermediation, declining stability of banking systems, and inhibited the development of banks (Borio *et al.*, 2001; Heid, 2007; Jokipii and Milne, 2008). In consequence, increased competition from foreign jurisdictions and non-bank financial institutions has prompted most banks to press for deregulation. It is also of note that the far-reaching effects of banking regulation and supervisions have prompted a significant proportion of regulatory officials to rethink their decisions in a bid to enhance their budgets.

Perhaps the delineations offered by (Borio *et al.*, 2001), Crockett (2000) and (Brunnermeier *et al.*, 2009) lend better insights into the pro-cyclicality of the economic and regulation cycles. For instance, capital requirements are likely to increase during an economic crisis, mainly when there is a possibility that risks could materialise. However, banks could reduce their lending in case of increases in the capital requirements. A phenomenon, which could worsen the economic crisis

because of the credit squeeze. Therefore, this pro-cyclical regulation and deregulation of capital requirements influence business and economic cycles. As such, output growth and capital requirements act as two opposites during such cycles. In summary, the private interest perspective is sceptical about the reliance on regulation to control the economy albeit the apparent market failures associated with banking systems. The critical issue here is in the time dimension is how system-wide risk can be amplified by interactions within the financial system as well as between the financial system and the real economy.

Furthermore, the feedback effects – the endogenous nature of aggregate risk – are of the essence. During expansions, declining risk perceptions, rising risk tolerance, weakening financing constraints, rising leverage, higher market liquidity, booming asset prices, and growing expenditures reinforce each other, potentially leading to the overextension of balance sheets, and off-balance sheets. The reverse process operates more rapidly, as financial strains emerge, amplifying financial distress. As a result, actions that are rational and compelling for individual economic agents may result in undesirable aggregate outcomes, destabilising the whole system.

Hence, the policy and scholarly question remain how to diminish the inherent *procyclicality* of the financial system”. Monitoring a macroprudential approach has implications for the monitoring of threats to financial stability generating from merger choices. In addition to calibrating prudential tools, primarily through attention to the sources of non-diversifiable (systematic) risk, propagatable returns, efficiency gains and growth that can provide a positive contagion and sustain resilient banks and financial sectors. Therefore, dampening the pro-cyclicality of the financial system is now widely regarded as a priority (Bakir, 2017; Battiston and Martinez-Jaramillo, 2018; Brunnermeier *et al.*, 2009; Martin *et al.*, 2016; Smets, 2014).

Given these cycles and externalities, banks increasingly realise the need to adopt a wide range of strategic choices, which follow the principles of models of navigating new and existing markets. Since this study seeks to diagnose strategic choices that banks take to manoeuvre the increasingly complex regulated and deregulated environments, it is reasonable to adopt the Ansoff market approach to demonstrate how financial institutions are penetrating new markets categorically.

Therefore, the underlying hypotheses posed in this thesis whether the strategic choice of product-market growth via mergers and acquisitions places concerned firms in a better position to navigate the economic and regulatory cycles, in the respective industry. Moreover, do FIs anticipate and overcome various forms of systematic and systemic risks? Are they able to maximise on their shareholders' value, economic value, scale, technical and technological efficiencies and to improve total factor productivity growth and sustainable growth? Each of these risks and returns and efficiencies is examined in devoted chapters analysing bank regulation and mergers and acquisitions in acquiring banks and target banks and non-bank financial institutions. In every chapter, the panel is segregated over merger deals and firm's performance for other environmental and idiosyncratic factors like deal size, firm size, closure and exposure to 2008 crisis announcement, and other deal criteria of geographic and activity focus or diversification.

### **1.3.7 Empirical Literature; assessment strategies and motivation**

M&As are highly risky ventures that generally lead to hesitation on the part of potential investors. M&A transactions must, therefore, provide a proper valuation to clarify the opportunity cost of the strategic decision. Valuation is the price which one party pays for the other to be willing to engage in the transaction. Since valuation is essentially an exchange process, it relies on free negotiation within a price mechanism. M&As are mostly valued through models such as the discounted cash flow, comparative ratios, and replacement cost all of which compare the current M&A value against the approximated future cash flows (Delis *et al.*, 2011b). M&A initiatives are risk-intensive and, thus, require a comprehensive risk management framework. For instance, globalisation has led to a highly dynamic environment which makes future planning difficult.

While there is a myriad of factors that could explain the proliferation of M&As, the current empirical evidence mainly points to examine; in addition to the regulatory environment and motives of size benefits (too-big-to-discipline or -fail), the three areas of consequential effect of mergers. That are **a)** productivity change and efficiency gains of M&As, **b)** the market valuation and economic value and growth, and **c)** the systematic and systemic risk factors of M&As. The theoretical and empirical literature continues to provide diverging evidence on bank mergers, especially towards their motives, benefits and outcomes. The following sections review the various dimensions of this literature.

### **1.3.8 Shareholders value and economic and financial performance**

There are two main approaches used to examine financial institutions returns; Observed Performance and Event Study (Rhoades, 1994). The observed operating performance studies analyse the end of year accounting measures of profits, costs and their ratios. While the event study approach inspects stockholder wealth adjustment as a response to merger and/or acquisition deals. The earlier is relatively latent while the latest analyses the immediate effect through wealth maximisation test of abnormal returns.

Rhoades (1994) argues that event studies yield mixed results. Generally, there are positive abnormal returns to targets and negative or no abnormal returns for bidders upon the announcement of an M&A deal; regardless of the geographic and chronologic spans of the studies he surveyed. Kwan and Laderman (1999), surveying the US bank consolidation studies published between 1974 and 1998, also find mixed results. Their analysis focuses on the effects of expanding banking powers to include securities and insurance activities in addition to banks engaging in real estate activities. Kwan and Laderman (1999) conclude that although bank diversification into securities and insurance activities is more profitable and provides diversification benefits, it is riskier to the portfolio of banks, and the combined (merged) FIs.

Amel *et al.* (2004) present a summary<sup>7</sup> of studies conducted between 1990 and 2001 on commercial banking *vis-à-vis* universal banking and financial conglomeration. They conclude that commercial bank M&As do not, on average, generate significant shareholder value. They suggest

---

<sup>7</sup> This study covers most industrialised countries (US, Europe, Japan, Australia, and Canada) and financial industries and activities (commercial banks, insurance and asset management companies and investment banks) besides cross-border transaction.

that there is no clear evidence on how shareholder value adjusts in response to M&As. This outcome supports the argument presented by DeYoung *et al.* (2009), in their review of a financial institution (FI) M&As in the post-2000 literature; suggesting that, there are not enough studies that examine the performance of universal banking and financial institutions' conglomeration attempts rigorously, before and after mergers.

Hence, there exists a theoretical inconclusiveness on the financial institution structure that can provide systemic and systematic stability and wealth maximisation; the diversified, the universal and conglomerate, or the focused structure. This ambiguity also extends to and stems from the empirical evidence on how markets react to different types of bank M&As, especially when stability is perceived through wealth maximisation improved profitability.

Empirical studies that investigate shareholders value creation yield mixed results on which mergers create more shareholders value. They differentiate between domestic mergers and cross-border mergers. Another level of comparison is overactivity diversification or focus. FIs mergers can be between firms in the same industry or a different industry (commercial banking, investment banking, insurance and real estate).

Beitel *et al.* (2004) conclude that European stock markets prefer focused M&A transactions over diversified ones. Target shareholders receive higher returns when the deal is more diversifying. Bidders are successful when the merger is an activity and geographically focused transactions, whereas targets seem to create more value in cross-border transactions. DeLong (2001b) results emphasise on the positive response of the US stock markets towards deals that tend to focus, both activity and geography, while the other types of M&As do not create value. Williams and Liao (2008) and Bellotti and Williams (2008) examine cross-border bank M&A deals that took place between 1998 and 2005. They find value creation and significant abnormal returns pattern for target banks, value destruction for bidder banks, but not if the activity is focused. These results contradict with

Cybo-Ottone and Murgia (2000) on European FIs mergers between 1988 and 1997. They show that European financial market positively appreciates bank consolidations that aim at focusing activities and those that diversify towards insurance activities. The combined performance of both bidders and targets is statistically significant for those deals. However, bank diversification towards securities firms or foreign institutions results in zero or negative returns for bidders, and narrow positive with lower significance for targets. The divergence between results in Cybo-Ottone and Murgia (2000) and Williams and Liao (2008) and Bellotti and Williams (2008) studies are attributed to several factors of methodology, period, examined institutions and deals and markets and industries criteria.

Bessler and Murtagh (2002) support the theme that foreign acquisitions in the insurance sector do not create share value. They also report that M&A deals involving a foreign commercial bank, as the bidder, and Canadian domestic wealth management or retail bank, as targets, do create value. Canadian commercial banks diversification into insurance creates value, while commercial banks to local wealth management and retail banking diminished or did not create value. DeLong (2001a) and (2003) confirm these results are valid in the US bank mergers during 1991 and 1995. Their results support the assumption that markets reward mergers that focus their geography and activity and can enhance the long-term performance of banks and financial institutions. A significant difference that could have led to the inconsistency between DeLong (2001a) and (2003) and Bessler and Murtagh (2002) is in the interpretation of geographic diversification in each of these studies. Mainly the borders and boundaries between jurisdictions and the regulatory frameworks differences between European countries – banks and the European bank on one side, and United American states-banks and the Federal reserve banks.

Amihud *et al.* (2002) and Beitel *et al.* (2004) examine European financial markets mergers. They report that the effects of cross-border mergers on returns of acquiring banks are significantly adverse. Beitel *et al.* (2004) propose that activity focus and geographic focus significantly drive

M&As and that high diversification impacts negatively the value creation for the bidding FIs. They argue that, from a combined point of view, the diversification hypothesis cannot be proven for European bidding banks and that non-diversifying transactions significantly create more value than diversifying transactions. Campa and Hernando (2006) diverge significantly from these results. Their analysis of 244 bank merger deals in the European countries (EU15) reports having lower excess returns for targets when the target is cross-border<sup>8</sup>. Results contradict with Lepetit *et al.* (2004), who confirms the existence of a positive and significant increase in value for target banks among all deals. However, they find positive and significant market reaction exists in cross-product diversification and geographic specialisation but not activity-focus deals.

In the USA financial market, Fields *et al.* (2007) report positive and significant abnormal returns for banks bidding for a bancassurance merger. This positivity further extends to finding low risk transmitted from insurance targets to bidding banks. Results coincide with the international evidence provided by Dontis-Charitos *et al.* (2011). They emphasise that bancassurance announcements lead to positive market reactions around the event days and create wealth for the bidding banks into insurance, but not vice versa. Factors that are attributed to this resolution are related to the expectations of financial markets; to the combined entity profile of being able to extend and expand markets, benefitting from economies of scale and scope. The study also reveals that geographic focus or diversification is highly dependable on the language barrier. Dontis-Charitos *et al.* (2011) argue that English speaking bank-insurance ventures tend to reap positive excess returns because regions sharing the same language tend to interrelate via similar cultural, trade practices,

---

<sup>8</sup> Where cross-border in this context refers to the political border of countries but still within the EU where financial institutions enjoy the usage of one currency and almost unified sets of rules with certain discrepancies.

business ethics and legal backgrounds. Ekkayokkaya *et al.* (2009) conclude that diversifying deals are value-enhancing and remain unaffected by the introduction of the Euro currency, while focused bids generated losses in the post-euro introduction phase. Chen and Tan (2011) confirm the same for the European market, FIs mergers. Positive cumulative abnormal returns (CARs) are observed for bidders, and two factors contributed to this; relative deal size and being a serial acquirer.

#### **1.3.8.1 Contribution and Main Results**

Therefore, a theoretical analysis of bank M&As reports mixed results and sometimes conflicting results for the same markets. Empirical studies have not concluded on **a)** stock market reaction to mergers, accounting measures of performance around the merger, productivity and efficiency changes following the merger, and the risk profiles of beta and systemic risk contributions of mergers. Some support bank activity and/or geography diversification, while others support geographic diversification, but combined with activity focus. Hence, this chapter follows a two-step approach investigating which strategy of FIs mergers and which FI structure creates more share and firm values. Other chapters will address the rest of the empirical evidence. This clause is examined via investigating shareholders value adjustment in the immediate event window **and** the extended event windows through Buy and Hold abnormal returns and accounting measures performance post- and pre-merger. The investigation of the above pillars would contribute to the renewed policy debate on the optimum Financial Sector (FIs and bank's) structures that can best create value for shareholders in a scrutiny of the diversification hypothesis.

Results show that FIs mergers destroy share value for the bidding firms pursuing a Market penetration strategy upon announcement, but there is no evidence for this in the extended horizon. Market Development and Product Development strategies enable shareholders' value creation in short and long horizons. However, Diversification strategies do not appear to influence bidding

shareholders value. Local bank to bank mergers create shareholders value and can increase their liquidity and economic value in the short run. Bank to Bank cross border mergers create value for bidders' shareholders in the long term but are associated with high costs and higher risks. Cross border Real Estate focused mergers create shareholders' value and can enhance return on equity and economic value. However, their long-run shareholder value costs more in overheads and expenses. Shareholders value drives long-run economic value for North American bank, but EVA is adversely affected by credit risk appetite in Australasian bank focused mergers.

### **1.3.9 Banking Regulation and Productivity and Performance**

Regulation has a significant influence on firms' decisions. Whether as part of the environmental factors affecting them (PESTEL) or as regulations directed to address specific firms and industries due to their significance in the economy. Due to such regulations (de-regulation or re-regulation), firms and financial institutions specifically, have to develop or restructure by adopting various strategies. Especially when these regulations are in response to significant and specific incidents.

Regulation in the banking sector is of high interest, to regulators, economists, scholars, and governments, due to its contribution to resilient banking sectors and economies. However, the impact of such regulations is still arguable and uncertain. A well-functioning regulatory and supervisory framework can help minimise moral hazard and discourage excessive risk-taking. Post-2008 crisis, questions arose about the suitability of the current regulatory setting, with several studies demonstrating that weaknesses in regulation and supervision are leading causes of the brutality and depth of the crisis (Cihak *et al.*, 2013a; Merrouche and Nier, 2014). While efforts to reinforce regulation and supervision are well underway in several countries, there is no evidence that any standard set of rules is universally appropriate for sponsoring well-performing and resilient banks. Reforms that might thrive in some countries may not stand good practice in other countries that have different institutional or economic settings. There is no extensive cross-country indication as to which of the many different regulations and supervisory practices active around the world work best to promote financial stability (Barth *et al.*, 2013b).

In theory, Barth *et al.* (2008a) postulate two main views on the inconclusiveness of how regulation and supervision affect bank performance. They argue that two general views provide convoluted predictions:

1. The “public interest view” that suggests that governments act in the interests of the public and regulate banks to promote efficient banking and ameliorate market failures (Keeley and Furlong, 1990; Kaufman, 1992). And
2. The “private interest view” that proposes that regulation is mostly employed to promote the special interests of the few, and not the broader public, thereby hindering bank efficiency and performance. The few here refers to banks themselves. Lessened efficiency, in this view, is a result of higher moral hazard and adverse selection based activities (Berndt and Gupta, 2009; De Meza and Webb, 1990; Ayadi, 2019).

These opposing views also have roots in empirical studies, with conflicting predictions, about the impact of specific regulations like capital requirements on bank performance.

Barth *et al.* (2004) argue that regulatory policies empower corporate control and foster incentives for private agents to work best to promote bank development, performance and stability. They also suggest that countries’ specificity added to political, social and legal differences motivates regulations, controlling for regulatory arbitrage. Consequently, they emphasise that banking systems differ among jurisdictions; hence, there is no single rule to apply globally. Barth *et al.* (2004) correspondingly argue that there is “no evidence that there is a universal best practice that is appropriate for promoting well-functioning banks”. This result suggests that only empirical evidence can prove the questionable effectiveness of specific regulations and supervision frameworks, by following a methodology that clusters the sampling regions and countries. Hence, the feasibility of global regulatory reforms, such as the Basel accords, and their jurisdictions’ adaptation are investigated for their stability, efficiency enhancement and development rather than just compliance.

#### **1.3.9.1 Bank regulation and productivity**

Banking regulation and performance literature suggest different approaches to study their interdependency. Three different perspectives are adopted in analysing bank regulation and productivity (Hendrickson, 2011); *central banks' policies, regulatory perspective* and *economic perspective*. Calomiris (2009b) links the economic response to the regulatory approach through broader governance of market structure. Which would influence banks' strategies, behaviour, and reaction towards innovations and panics resulting from demand and supply conditions or market imperfections.

Furthermore, bank regulations cannot be observed in isolation from economic variables of inflation and production, Demirgüç-Kunt *et al.* (2003) argue. They also postulate that bank regulation, over entry to new markets and activities (diversification into insurance, investment banking and real estate), boosts net interest margins and that inflation exercises a robust positive impact on bank margins. Following Demirgüç-Kunt *et al.* (2003) and Delis *et al.* (2011b), this chapter examines the regulatory perspective, as it extends to reflect central bank policies and economic perspectives. The technique to pursue this is by examining the interdependencies and interactions of the several regulatory frameworks on banks performance and productivity growth in a cross-country and multi-period setup.

The banking literature is sharply divided concerning the effects of capital requirements on bank behaviour (Hoose, 2010). Barth *et al.* (2004) conclude that higher capital requirements have no significant impact on banking sector development. Ayadi *et al.* (2016a) also indicate that compliance with Basel Core Principles for Effective Bank Supervision, or any of its chapters, has no association with bank efficiency. However, Brun *et al.* (2013) argue that a one percentage point increase in capital requirements leads to a reduction in lending by approximately 10% for French banks between 2008 and 2011. For the reason that it creates a procyclicality, which drains out banks' most needed funds

at the bottom of the credit cycle when they most need liquidity to ward-off crunches. Pasiouras (2008b) finds a significantly positive correlation between supervision empowerment and banks' productivity enhancement through technical efficiency.

Tirtiroğlu *et al.* (2005) examine the impact of U.S. intrastate and interstate deregulations on bank TFP growth and find that intrastate branching liberalisation has a positive long-run impact on productivity growth. Isik (2007) and Aysan and Ceyhan (2008) finds that the productivity of Turkish banking-sector reforms (BSRs) post-2001 improved significantly as the reform process accelerated. Gilbert and Wilson (1998) find that Korean banks responded to privatisation and deregulation during the 1980s and early 1990s by altering their mix of inputs and outputs, yielding substantial changes in productivity. In contrast to the above studies, Tirtiroğlu *et al.* (1998) find a negative relationship between regulatory initiatives and TFP growth in U.S. commercial banking over the period 1946–95<sup>9</sup>. Furthermore, Grifell-Tatje and Lovell (1996) conclude that the relaxation and removal of regulatory constraints in the Spanish savings bank sector, led to an increase in branching and merger activity although this could not explain the magnitude or nature of productivity decline found over the study period.

### **1.3.9.2 Contribution and main results**

Censuring securitisation as one of the leading causes and propagators of the 2008 subprime crisis (FCIC, 2011), regulators are re-effecting the Glass-Steagall Act type of restrictions (Saunders

---

<sup>9</sup> With the Federal Deposit Insurance Act of 1950, the Competitive Equality Banking Act of 1987, the Depository Institutions Act of 1982, and the Depository Institutions Deregulation and Monetary Control Act of 1980 being the most influential regulatory initiatives.

*et al.*, 2006) through ring-fencing<sup>10</sup>. Activity restriction investigated in this study includes securitisation and Non-Bank activities such as insurance. Barth *et al.* (2008d) argue that activity restrictions of securities, insurance, and real estate pose **no** significant impact on banks' risk-taking and hence, system stability or fragility. On the contrary, they believe that other activities would enable banks to diversify their income streams and immunise their activities, contributing to resilience against shocks. Diversification might also “increase the franchise value of banks and thereby augment incentives for more prudent behaviour” (Barth *et al.*, 2008d). Delis *et al.* (2011b), Chortareas *et al.* (2012) and Tanna *et al.* (2017) arrive at similar results. Therefore, the impact of diversification (securities, insurance, and real estate activities) on bank performance is not yet conclusive. This approach provides further motivation for examining the banking sector performance in reaction to regulations and reforms that lead to mergers and or acquisitions.

Typically, the literature that focuses on regulations and productivity tends to; (i) examine individual countries, or group of countries in one policy mechanism (the EU case), (ii) evaluate overall regulatory reforms (usually captured by dummy variables) and productivity change over deregulation periods, and (iii) generally yield conflicting findings. The methodological approach of this chapter aims to shed more light on the regulations–productivity nexus, by using a cross-country setting to focus on specific regulatory indices that relate to the three pillars of Basel II and III accords as well as country-specific stability, freedom and macroeconomic measures. This chapter examines the impact of regulation, and other micro- and macroeconomic factors on banks' productivity growth, in an international sample of 2,155 banks from 93 countries.

---

<sup>10</sup> Ring-fencing regulations aim at restricting Universal Banking (Koetter *et al.*, 2007).

Results show that high capital requirements enhance productivity growth in North and Latin American banks, but not in European African or Asian banks. Supervisory powers drive bank productivity growth in all regions, except Europe and Central Asia. Restrictions on real estate, insurance, and securities activities impede productivity change in all Income level groups, but not in High-Income Economies. Results also show that market volatility and Z-score drive technological change and scale efficiency growth, but negatively impact pure technical efficiency.

### **1.3.10 Bank Mergers and Systematic and Systemic Risks**

The banking industry is influenced and driven by macroeconomic dynamics (Bostic *et al.*, 2009; Cooper and Dynan, 2014). A drive that banks need in order to survive volatile and uncertain environments, to maintain competitive advantages through risk management when considering restructuring or diversification via mergers.

Do bank mergers add to the instability of the financial system? How? Bank mergers could stabilise an individual bank and decrease its contribution to systemic risk because consolidation can lead to an increase in the diversification of the company's assets and loan portfolio and consequently higher capital buffers (Weiß *et al.*, 2014). However, the financial system could get more fragile as these individual risks are reallocated (instead eliminated) across the system. This reallocation of risks leads to having individual institutions to be exposed to similar risks allowing a systemic shock at an individual institution to be transmitted to the whole system, due to functional and/or geographical interconnectedness through consolidations (country risk, liquidity and solvency risk and credit risks) (Wagner, 2010).

Bank consolidations create more prominent institutions that can be “Too Big to Fail” (TBTF) or Systemically Important Financial Institutions<sup>11</sup> (SIFIs or Too-SIFI) posing more threat at systematic and systemic levels (Berger, 2000). Recent turbulence in the financial system, with the hike in the 2008-2011 crisis, raised the discussion regarding new supervisory and regulatory tools for

---

<sup>11</sup> As the Financial Stability Board (2010), SIFIs are defined as financial institutions “whose disorderly failure, because of their size, complexity and systemic interconnectedness, would cause significant disruption to the wider financial system and economic activity”. According to the Basel III agreements, these institutions should face a capital ‘surcharge’ determined according to the ‘negative externalities’ they generate, i.e. their contribution to the aggregate risk of the financial system.

financial institutions. The recent introduction of additional capital requirements<sup>12</sup> for SIFIs (and TBTF) is an example of concrete measures taken by regulators to consider, isolate and eliminate systemic risk. Consequently, the debate on the optimal bank and FIs structures follows two different 'diversification hypotheses' (Herring and Santomero, 1990; Piloff and Santomero, 1998; Herring and Carmassi, 2010; Molyneux *et al.*, 2014); Diversification-Stability and Diversification-Fragility.

#### **1.3.10.1      *Diversification-Stability***

Bank diversification allows banks to diversify risk by having a lower correlation in their portfolio of assets and activities and generating economies of scope and scale and increased efficiencies through cost-saving and revenue enhancements (Houston *et al.*, 2001; Vennet, 2002; Hirtle and Stiroh, 2007). On the diversification stability camp also stand several theories. Boyd and De Nicoló (2005) and De Nicoló and Lucchetta (2009), among others, support diversification from a moral hazard perspective. Hence, following the portfolio theory, it is synthesised that geographic expansion should lower a bank's risk, especially when it involves adding assets whose returns poorly correlate with existing assets. Henceforward, stability literature emphasises that efficiencies (cost and scale) experienced by diversified banks can enhance stability (Diamond, 1984; Boyd and Prescott, 1986; Schaeck and Cihák, 2014).

#### **1.3.10.2      *Diversification-Fragility***

Bank diversification increases system interconnectedness, that is seen as the conveyor of failures by transmitting risks among financial institutions (Berger *et al.*, 2012). Risks of financial

---

<sup>12</sup> In Basel III and in The Banking Reform Act (UK-2013), Dodd-Frank Wall Street Reform and Consumer Protection Act (US-2010) following recommendations from the Volcker, Vickers and Liikanen Reports respectively.

conglomeration, spill-overs<sup>13</sup> and 'too-big-to-fail or discipline' institutions are other concerns of the opponent view to diversification (Berger and Humphrey, 1994; Moshirian, 2012). Diversification is realised to have decreased efficiency and created negative economies of scope (Laeven and Levine, 2007; Stiroh and Rumble, 2006; Gambacorta and Rixtel, 2013).

Advocates of concentration–stability (diversification-fragility) argue that banks in more concentrated markets tend to be more stable due to either the charter value hypothesis or the adverse selection and better-informed position hypothesis (Ijtsma *et al.*, 2017). Consequently, banks in more concentrated markets will be: **a**) less interested in overly or disproportionately risky lending (Chan *et al.*, 1986; Repullo, 2004; Allen and Gale, 2004), **b**) will better scrutinise loan applications to safeguard their charter value (Hauswald and Marquez, 2006; Cordella and Yeyati, 2002) and **c**) can be less contagious for spill-overs or failures (Sáez and Shi, 2004), especially when considering the enhanced ease of monitoring and lessened opportunity of regulatory arbitrage<sup>14</sup>.

### **1.3.10.3 Contribution and Main Results**

Another strand of related literature analyses the causes of system-wide crises and systemic risk from the country level perspective, mostly using a bank crisis dummy (indicator) variable. Examining

---

<sup>13</sup> The spill-overs or the transmission of shocks (risk) from the financial sector to the real economy (Baur, 2012; Melvin and Taylor, 2009) and the interactions between global imbalances, credit risk spreads, housing markets and macroeconomic variables and across markets (Chevallier, 2012).

<sup>14</sup> Regulatory arbitrage is a practice whereby firms capitalise on loopholes in regulatory systems to circumvent unfavourable regulation. Despite the large level of international bank flows, and despite attempts to increase the global coordination of bank regulation, much of banking regulation and supervision remains jurisdiction (national) level. Cross-country regulatory competition, as a form of regulatory arbitrage, may enable banks to effectively evade costly regulations. Such regulatory competition enables banks to circumvent avoid regulations and take excessive risks (Barth *et al.*, 2008c). These types of regulatory arbitrage activities expose several jurisdictions to the influence of excessive risk taken at one, considering the interconnected nature of financial markets and institutions (Houston *et al.*, 2012).

the effect of banking market concentration on systemic risk and the possibility of a financial crisis, Beck *et al.* (2006) and Schaeck *et al.* (2009) find that higher levels of banking market concentration decrease the likelihood of a financial crisis. However, Boyd *et al.* (2009) find contrasting evidence. They find that increased banking market concentration leads to a sharp decline in lending, which is symptomatic of crisis. Although this focus on examining real crises can be intuitively attractive, it has a downside that an indicator (dummy or theorised) variable does not deliver information about the intensity of the crisis and its magnitude in losses in capitals nor about the fragility of the sector before the crisis (or after). Consequently, several recent studies follow the bank-level analyses utilising the z-score as a proxy of the solvency of individual banks. Combining aspects of the country-level and bank-level approaches Uhde and Heimeshoff (2009) find a negative relation between banking market concentration and financial stability (aggregating the z-score of individual banks to synthesise the whole system Z-score which measures the solvency of a country's financial sector).

Literature inconclusiveness, combined with the renewed policy debate on the optimum bank's structures that best create value and prevent risk and its propagation into distresses, motivates the examination of the diversification hypothesis, through investigating different markets reactions to different bank mergers, banks' and target FIs *systematic* risk and their *systemic* risk contributions.

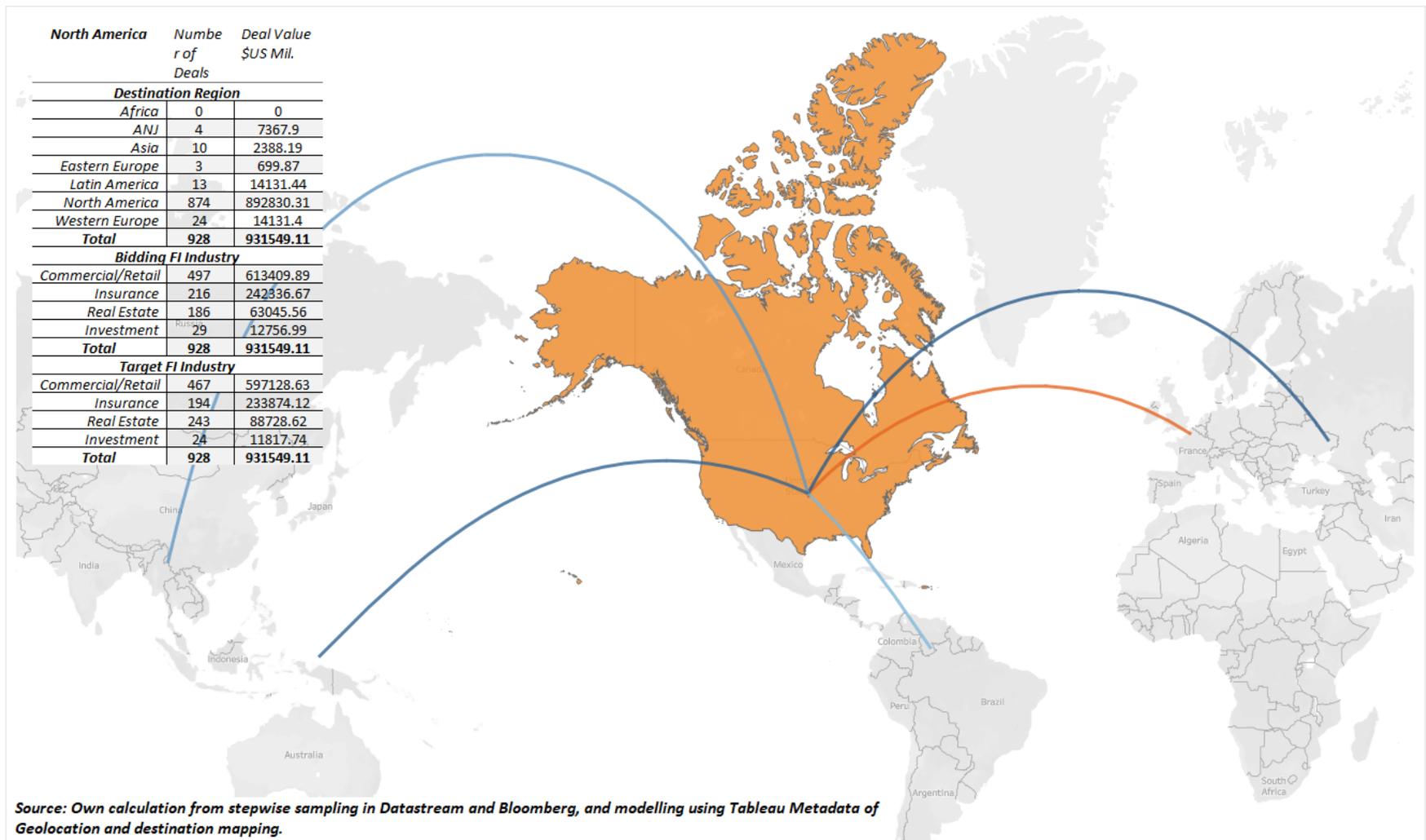
Results indicate that bank mergers are associated with systemic risk. Improvements in operating profit and well-controlled cost of capital can contribute to decreasing systematic risks and capital shortfalls, and consecutively systemic risk contribution. Cross border deals tend to be sensitive to payment type and prefers cash transactions. Large acquiring banks decrease systemic risk contribution in cross-border M&As with a non-bank financial institution, and witness profitability (ROA) gain, supporting geographic diversification stability. Capital requirements, activity restrictions and bank concentration increase systemic risk contribution in national mergers. Bank

mergers with Diversified and Investment FIs targets enhance Productivity (TFP) and overall efficiency but not technical efficiency, contrary to bank-real estate deals where technical efficiency change accompanied lower systemic risk contribution. Unlike ROA, leverage and net operating profit, Sustainability growth rate and ROE significantly improve in all diversifying deals and decreases systemic risk contribution.

### 1.3.11 Appendix



*Figure 1-8 Eastern Europe Financial institutions mergers; number and value of deals (+US\$100 Mil, 1999-2018) and their distribution by target institution industry.*



**Figure 1-9 North America Financial institutions mergers; number and value of deals (+US\$100 Mil, 1999-2018) and their distribution by target institution industry.**

Source: Own calculation from stepwise sampling in Datastream and Bloomberg, and modelling using Tableau Metadata of Geolocation and destination mapping.

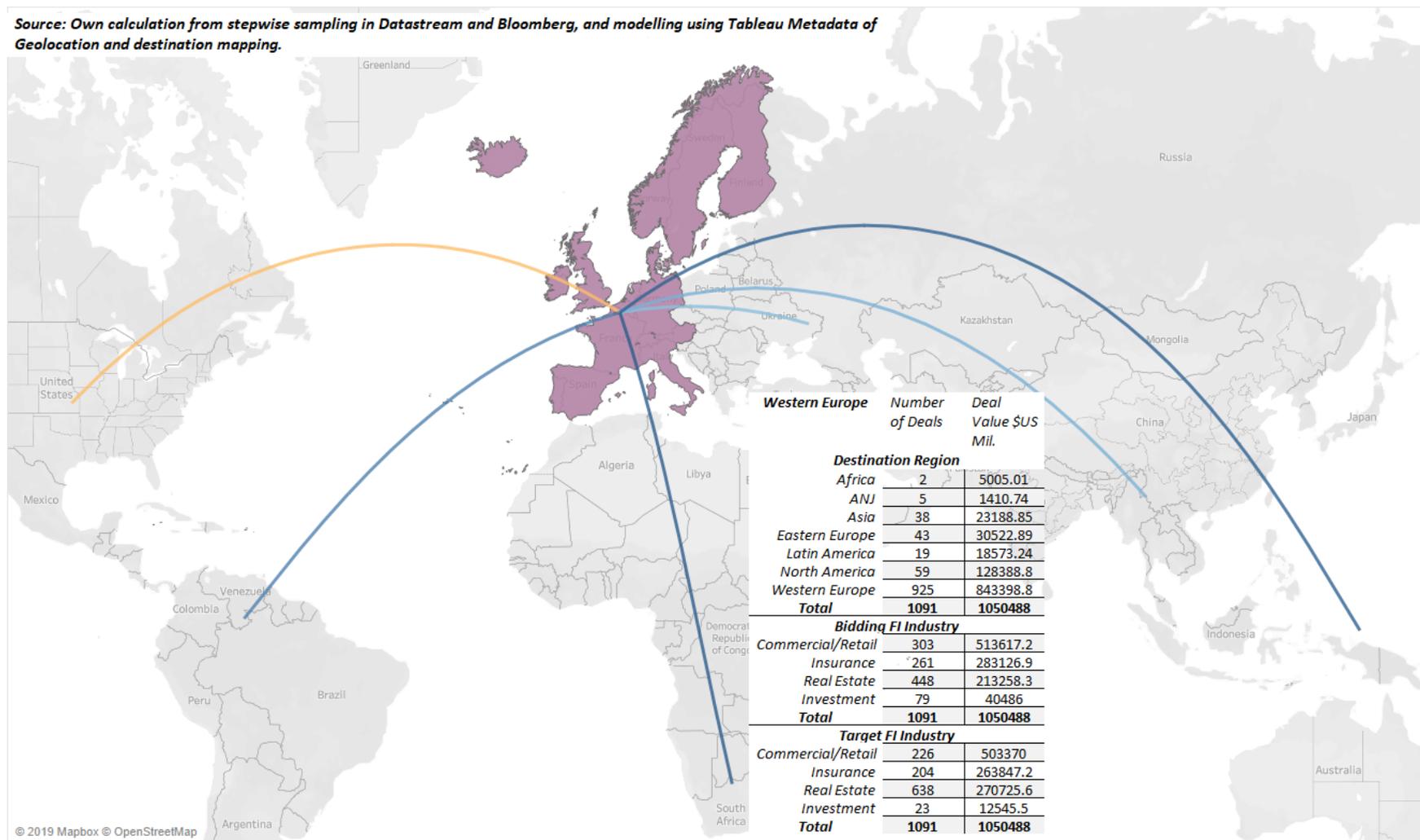
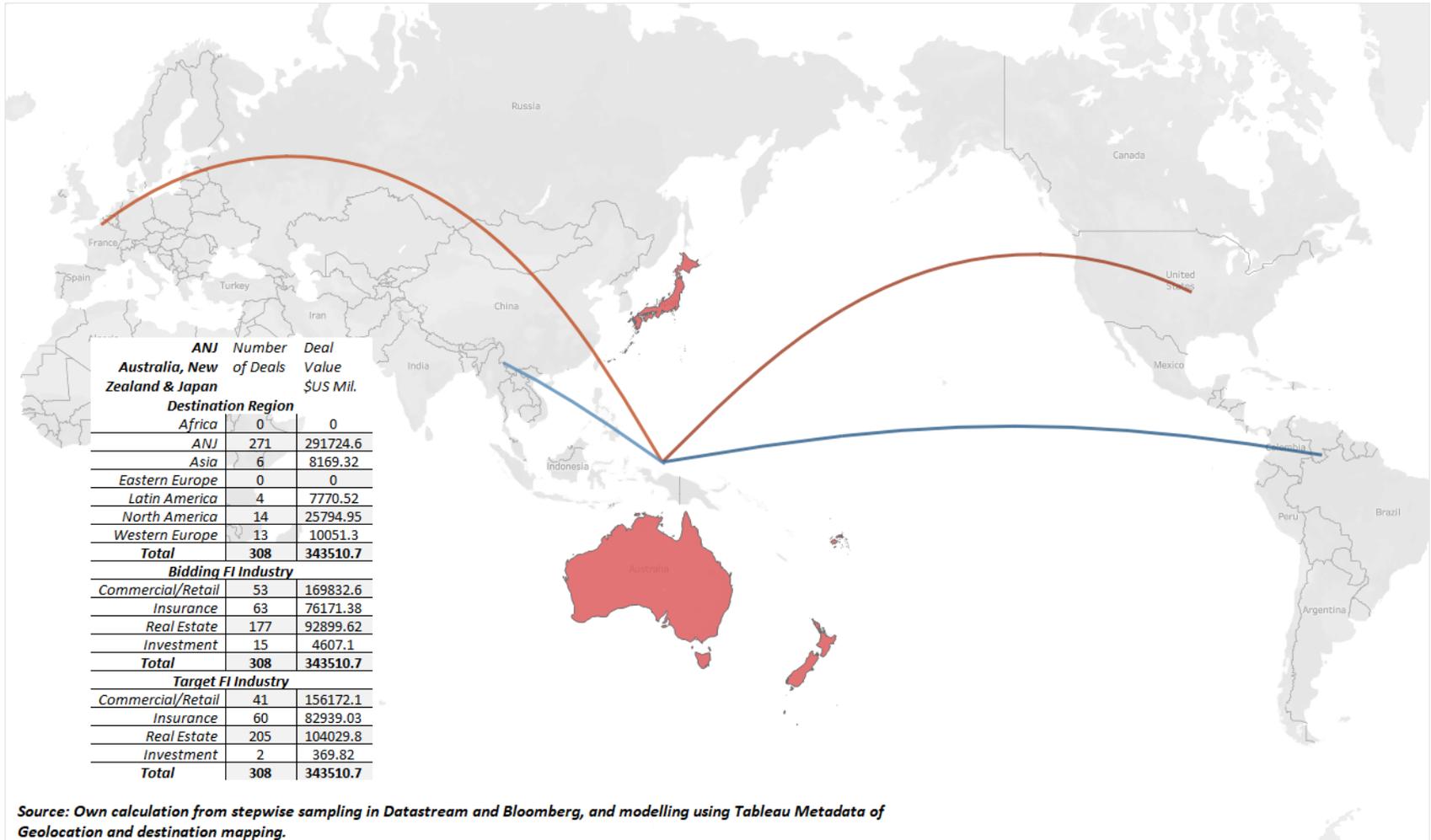
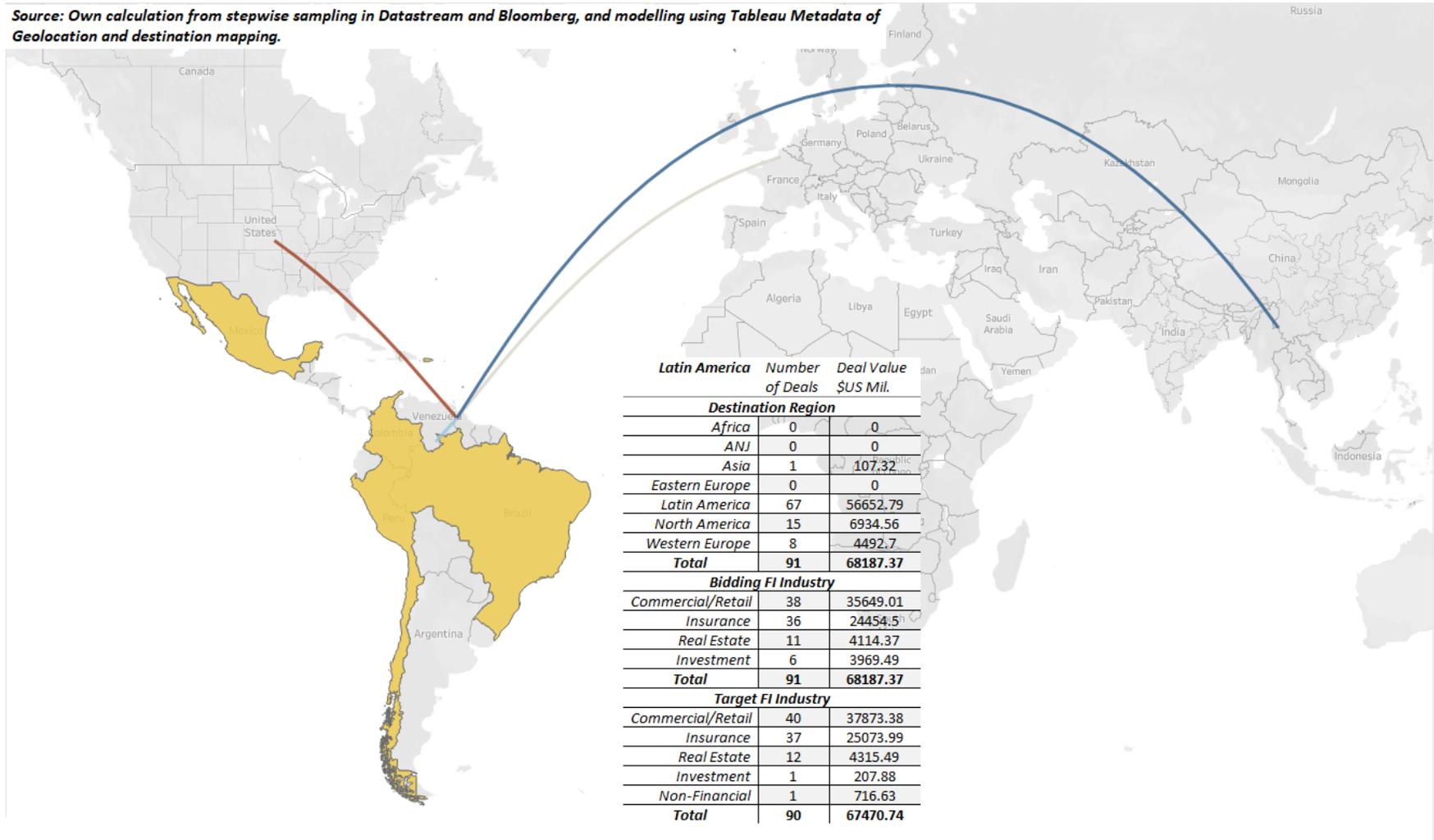


Figure 1-10 Western Europe Financial institutions mergers; number and value of deals (+US\$100 Mil, 1999-2018) and their distribution by target institution industry.

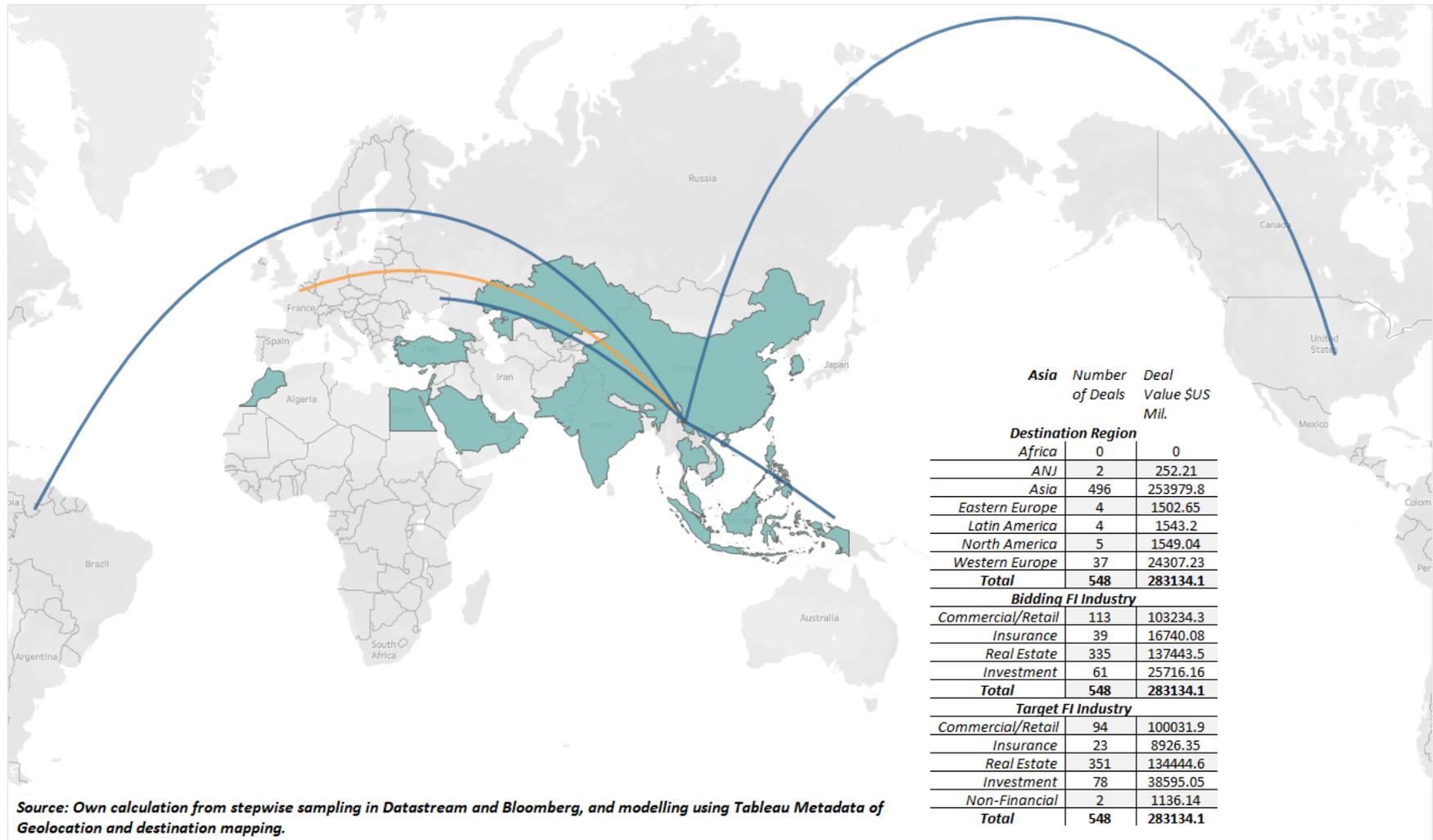


**Figure 1-11 ANJ- Financial institutions mergers; number and value of deals (+US\$100 Mil, 1999-2018) and their distribution by target institution industry.**

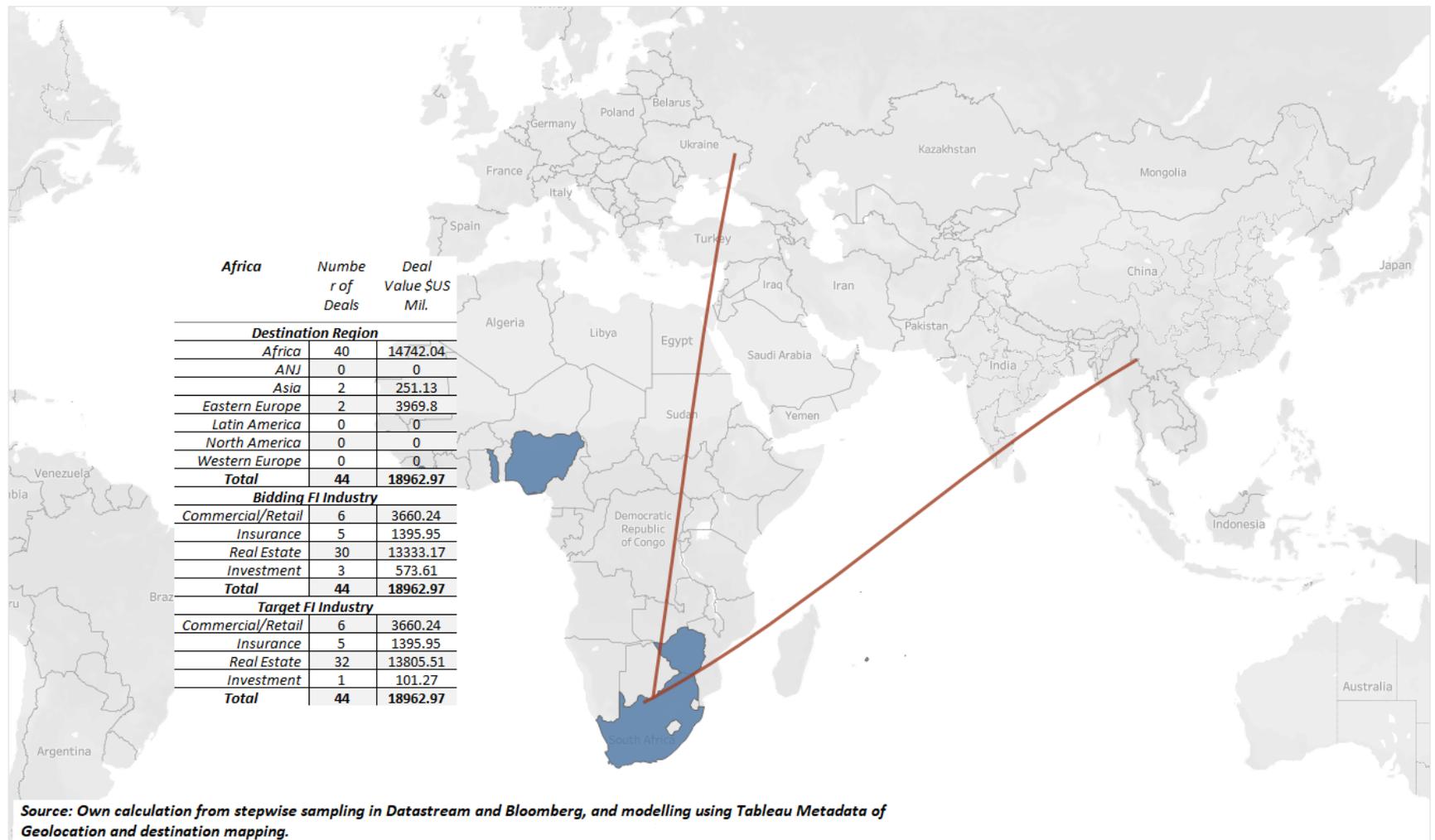
Source: Own calculation from stepwise sampling in Datastream and Bloomberg, and modelling using Tableau Metadata of Geolocation and destination mapping.



**Figure 1-12 Latin America Financial institutions mergers; number and value of deals (+US\$100 Mil, 1999-2018) and their distribution by target institution industry.**



**Figure 1-13 Asia Financial institutions mergers; number and value of deals (+US\$100 Mil, 1999-2018) and their distribution by target institution industry.**



**Figure 1-14 Africa Financial institutions mergers; number and value of deals (+US\$100 Mil, 1999-2018) and their distribution by target institution industry.**

# **2 Financial Institutions Mergers; Shareholders, Economic Value and Financial Performance**

## 2.1 Introduction

Despite the limitations put, in recent financial regulations, on diversification and conglomeration through ring-fencing, financial institutions are still diversifying and benefiting from regulatory arbitrage and immunity through mergers. Between the great depression of the 1930s and the aftermath of the 2008-2011 financial crisis, there have been waves of financial stress followed by tightening regulations, then innovations to break those out followed by deregulations<sup>15</sup>. The recent financial crisis has led regulators to prohibit several growth strategies and financial institutions (FIs) diversification initiatives. Increasing capital buffers and limiting financial institutions ability to diversify through ring-fencing were the main tools. However, quite recently, several financial institutions expressed discontent with the recent regulation, because of their profits draining criteria. Hoeing (2018) documents a bill to the US Congress that permits banks to deduct cash held on behalf of clients from the calculation of Leverage. Doing so would lower the amount of capital the banks need as buffers and allow them to yield more cash to shareholders in the form of dividends and share buybacks. Such moves are expected to grow further in an attempt to repeal many of the 2012-2015 financial regulations.

---

<sup>15</sup> Following the great depression when more than 5,000 banks failed in the US, financial markets witnessed the passage of The Banking Act (Glass-Steagall Act (GSA)) in 1933. Sections 20 and 32 of this act restrict bank activities and prevent commercial banks from trading securities directly or via affiliates. The Banking Act (1933) is then revamped through the Bank Holding Companies Act (BHCA) in 1956 (Westerfield, 1933). The BHCA closed the loophole of banks' diversifying into risky investments under an 'umbrella' of holding company. Technological advances followed by consolidation waves, between the late 1980s and early 1990s, made it difficult to distinguish between the bank's traditional activities and diversified ones; real estate, securities and insurance. BHCA is then officially repealed by the enactment of Gramm–Leach–Bliley Act (Financial Services Modernisation Act - FSMA) in 1999 (Carpenter and Murphy, 2010). FSMA promoted financial holding companies that were allowed to act as an 'umbrella' of companies permitted to own subsidiaries in different financial activities and different jurisdictions (Yeager *et al.*, 2007).

This reoccurring cycle of re-regulation and deregulation, following the recent crisis along with the financial and social costs following it, has renewed the debate over what growth strategies financial institutions and banks should adopt. Especially in the contexts of addressing; **a)** interconnectedness and risk propagation among industries to and from banks, real estate, insurance and investment companies and **b)** returns that adds value to investors and FIs in the short and long runs.

Evidence from the period before the 2008-2011 crisis shows focus averseness and diversification eagerness, resulting in a large number of bank M&A deals and multinational, diversified, sophisticated and 'too-big-to-fail or discipline' financial institutions (FIs) (Berger *et al.*, 2012; Moshirian, 2012). This situation has also diminished the boundaries between conventional banking and diversified universal banking. Excessive securitisation<sup>16</sup> accompanied by significant defaults in the mortgage market caused a financial crisis in the interconnected financial system. Subsequently, the occurrence of the 2008 crisis and its global spread through financial systems' interconnectedness has reignited the scholarly and policy debate over resilient bank structures. Particularly, accentuating probes into financial institutions' sizes and the purpose and correlation of assets and activities held in their portfolios (Koetter *et al.*, 2007).

This can be observed through the recently enforced banking acts; in the US, Dodd-Frank Act (DFA) (2010) and its section 619 known as the Volker's Rule, that came into full effect in April 2014

---

<sup>16</sup> Mortgage Backed Securities (MBSs); mortgage loans were securitised and sold out under the model "Originate to Distribute" in a technique to mitigate risk away from banks' balance sheets, and to generate more funds for further investments which was again securities from other banks, and mostly MBSs (Mortgage Backed Securities), which opened the way for innovations in securitisation market for slicing, trenching,...which only rechannelled the risk from bank to bank and made off-balance sheet investments even bigger than the balance sheet itself and risk was magnified instead of being mitigated (Angelides and Thomas, 2011).

(Issued December 2013). This act prevents having any structural linkage between banking and most nonbank, casino-like, activities. However, in the U.K., the focus is on the functional rather structural separation. The Financial Services Act (2013), which followed the Vickers' Report (2011), requires banks to create individually capitalised institutions, other than banks, to conduct any nonbank activities. Connectedly, in Europe and following the propagations of the 2008-2011 financial crisis, Liikanen *et al.* (2012) reported several recommendations to reshape European banks, including ring-fencing retail banking, to the European Commission (EC). The Liikanen (2012) committee advised that proprietary trading and other significant trading activities should be assigned to a separate legal entity if the activities to be separated amount to a significant share of a bank's business.

Consequently leading to ceasing the support given by deposits and the explicit guarantees they carry to be utilised in risky trading activities. It is essential to mention that, the immediate effect of these acts is thought to impede banks' ability to act as shock absorbers in times of stress or when capital buffers become less due to market conditions (Walker, 2014). Hence, how banks can sustain a permanent, idiosyncratic and full risk-return enhanced status<sup>17</sup> is the continuously renewed policy debate, which feeds into the vein of regulatory dialectic and procyclicality (Kane, 1977, 1981a).

The renewed debate (Herring and Santomero, 1990; Piloff and Santomero, 1998; Herring and Carmassi, 2010; Molyneux *et al.*, 2014) on optimal bank structure floats two different 'diversification hypotheses':

---

<sup>17</sup> Risk-return enhanced status can be achieved by controlling banks' exposure to risks from activities and volatile markets along with adequate capital management through mergers. Specifically, through diversification or focus with higher performance FIs (value creation through stock market's appreciation of deals and enhanced efficiency) and with lower imposed or generated systemic and systematic risks (Berger and Humphrey, 1994; Moshirian, 2012).

**H<sub>1</sub>** - Bank diversification allows banks to diversify risk and enable generating economies of scope and scale and increased efficiencies through cost-saving and revenue enhancements (Houston *et al.*, 2001; Vennet, 2002; Hirtle and Stiroh, 2007) and

**H<sub>2</sub>** - Bank diversification increases the systemic risk (Berger *et al.*, 2012) and decreases efficiency and creates negative economies of scope (Laeven and Levine, 2007; Stiroh and Rumble, 2006; Gambacorta and Rixtel, 2013).

The contribution of this study feeds into the strand of diversification versus focus or 'ring-fencing' scholarly and policy debate. That is, by identifying what types of activities/products are more likely to create shareholder value for financial institutions, and banks at their forefront — resulting in a simultaneous enhancement in their profitability, wealth maximisation and credit risk aversion profiles (Caruana, 2012). This study contributes to investigating the risk-return profile of financial institutions mergers (Herring and Santomero, 1990; Piloff and Santomero, 1998; Herring and Carmassi, 2010; Molyneux *et al.*, 2014) by drawing inferences on; “How Financial Institution's mergers with other financial institutions of banks, real estate, investment and insurance business entities influence their shareholder value creation and performance”.

The paradigm of this chapter examines financial institutions' growth strategies of merger and acquisitions success; through investigating how financial institutions have diversified or focused their activities and geographical presence, and the impact of each orientation on bidders shareholders' value and year-end performance. Specifically, analysing the four dimensions of Ansoff's (1980) Matrix of the market and product development when adopted by FIs, and how each strategy contributes to the merger success through creating (or destroying) shareholders' value and enhancing FIs liquidity, profitability and risk profile. It is an improvement over current finance literature because it deploys two different strategies in the analysis. At a univariate level, shareholder value creation and market reaction to merger announcements are examined over short (-5 +5 days) and long (+ 230 days)

windows of the event. Followed by regressing the resultant Cumulative Abnormal Returns (CARs) and Buy and Hold Abnormal Returns (BHARs) over financial performance variables at the multivariate level. Namely, the methodology of the event study is used to calculate abnormal returns (CARs and BHARs), and the observed performance strategy that monitors FIs financial ratios from two years before the merger to two years after.

The sample carries additional importance about its period as it extends from 1991 to 2018. The FIs M&As examined in this study cover the periods of several markets (Financial) crunches that followed the dotcom and real estates bubbles of the 1990s. It also includes the re-regulation and deregulation movements in Europe, US and the rest of the world around the 2008-2011 financial crisis up until 2018 early signs of deregulation again.

Results show that FIs mergers destroy value for the bidding firms pursuing a Market penetration strategy upon announcement, but non-significant share value adjustment in the extended horizon. Market and Product Development strategies promote value creation for shareholders in short and long horizons. However, Diversification strategies do not appear to have a significant influence on acquiring FIs shareholders value in both short and long horizons of the merger. Local bank to bank mergers create value for shareholders and can increase their liquidity and economic value in the short run. Bank to bank cross border mergers create bidder's shareholder value in the long term but are associated with high costs and higher risks. Cross border Real Estate focused mergers create shareholders value and can enhance return on equity and economic value. However, their long-run shareholder value come at the cost of decreased liability and increase cost and expenses. Shareholders value also drives long-run economic value for North American bank bidders. EVA is also negatively influenced by the broad base of loans compared to deposits, hence credit risk, and low net loans to assets in Australasian bank focused mergers.

## **2.2 Financial Institutions mergers: a literature review**

The finance literature encompasses an extant body of studies that examine the performance of FIs M&As concerning their risk and return profiles. Despite differences in methodologies followed and variables examined, there are two main approaches used, namely, Observed Performance and Event Study (Rhoades, 1994). The observed operating performance studies analyse accounting measures of profit rates or cost ratios, or both, and compare the pre-merger to the post-merger results to account for profit, cost and operating efficiencies. However, the event study approach inspects stockholder wealth adjustment as a response to merger and/or acquisition deals.

Rhoades (1994) surveyed 19 observed performance studies and 21 event study examinations. They conclude that operating performance studies provide consistent evidence that FIs and banks mergers generally show no efficiency gains; evidenced by non-changing return on assets and/or return on equity for the combined institution along with non-improved profitability. There is some improvement in return on equity resulting from the merger, but no improvement in return on assets or cost-efficiency. Spong and Shoenhair (1992) find evidence of an improvement in overhead cost efficiency, as a result of the merger, but no significant improvement in return on assets or equity. There is a reduction in noninterest expenses relative to assets. However, Rhoades (1994) also argues that event studies in that same period yield mixed results. Generally, there are positive abnormal returns to targets and negative or no abnormal returns for bidders upon the announcement of an M&A deal; regardless of the geographic and chronologic spans of these studies. Consistently, Kwan and Laderman (1999), surveying the US bank consolidation studies published between 1974 and 1998, find similarly mixed results. Their analysis focuses on the effects of expanding banking powers to include securities and insurance activities in addition to banks engaging in real estate activities. Kwan

and Laderman (1999) conclude that although bank diversification into securities and insurance activities is more profitable and provides diversification benefits, it is riskier to the portfolio of banks.

Amel *et al.* (2004) present a summary<sup>18</sup> of studies conducted between 1990 and 2001 on commercial banking *vis-à-vis* universal banking and financial conglomeration. They conclude that commercial bank M&As do not, on average, generate significant shareholder value, and it does not improve cost and profit efficiencies. Amel *et al.* (2004) suggest that there is no clear evidence on how shareholder value adjusts in response to M&As. This outcome supports the argument presented by DeYoung *et al.* (2009), in their review of a financial institution (FI) M&As in the post-2000 literature; suggesting that, there are not enough studies that examined the performance of universal banking and financial institutions' conglomeration attempts rigorously, before and after mergers.

Hence, there exists a theoretical inconclusiveness on the financial institution structure that can provide systemic and systematic stability and wealth maximisation; the diversified, the universal and conglomerate, or the focused structure. This ambiguity also extends to and stems from the empirical evidence on how markets react to different types of bank M&As, primarily when stability can be achieved through wealth maximisation improved profitability.

### **2.2.1 Financial Institutions mergers: Empirical Evidence**

A substantial body of research examines the performance effects of bank mergers, using accounting data, and finds mixed evidence. Ramaswamy (1997), Houston *et al.*, (2001), DeLong (2003) and Zollo and Singh (2004) find no suggestion of any merger-related performance

---

<sup>18</sup> This study covers most industrialised countries (US, Europe, Japan, Australia, and Canada) and financial industries and activities (commercial banks, insurance and asset management companies and investment banks) besides cross-border transaction.

improvements as measured by return on assets (ROA). However, Deng and Elyasiani (2008), Berger *et al.* (2010) and Molyneux *et al.* (2014) find a significant and positive adjustment of ROA in acquiring financial institutions following an M&A. In addition to Uhde and Heimeshoff (2009), who confirms the positive impact of FIs merger on ROA through increased market concentration and capital ratios. Furthermore, return on equity (ROE), and operating income profitability examination also revealed an inconclusive association with mergers. Especially when differentiating between different financial markets (US, Europe, Asia, Latin America). For the US, Linder and Crane (1993), Akhavein *et al.* (1997) and Altunbas and Ibanez (2008) find no evidence of operating income or ROE improvements following M&As. These results are consistent with Altunbas and Ibanez (2008) for the European financial institutions. However, some studies document merger-related improvements in profitability and operating performance. Campa and Hernando (2006), Cornett *et al.* (2006) and Goddard *et al.* (2008), all confirm causality between FIs mergers and profitability enhancement through ROA and ROE. Notably, Beccalli and Frantz (2009) report negative changes in these accounting measures for cross-border mergers. Contrary to domestic deals; where cost efficiency improves more markedly, and profit efficiency remains unchanged instead of diminishing. Beccalli and Frantz (2009) testify the importance of geographical relatedness to achieve better post-M&A. While Hagendorff and Keasey (2009) show evidence on the positive performance of cross border mergers across Europe.

Measuring a firm's (long-term) financial performance following a merger is founded on the suggestion that comparing the accounting data of the companies involved in an acquisition, before and after the transaction, gives an accurate measure of the synergies that are created when the assets of two firms are combined. When assessing post-merger performance, scholars calculate returns for either assets (Akhavein *et al.*, 1997; Ramaswamy, 1997; Houston *et al.*, 2001; Zollo and Singh, 2004; Altunbas and Ibanez, 2008), income or cost. Several studies employ cash flow data rather than profits

in order to avoid having results affected by choice of merger finance or accounting method (Ghosh, 2001; Healy *et al.*, 1992). Generally, studies showing a decline in post-merger profitability employ earnings-based measures, while studies showing merger gains are based on cash flow performance measures (Martynova and Renneboog, 2008).

Studies that investigate FIs mergers impact also include the examination of shareholders value creation. These studies also yield mixed evidence on which mergers create more shareholders value. They differentiate between domestic mergers and cross-border mergers. Another level of comparison is over the activity diversification or focus. FIs mergers can be between firms in the same industry or a different industry (commercial banking, investment banking, insurance and real estate).

Beitel *et al.* (2004), in their study of stock market reaction to European bank M&As<sup>19</sup>, using an event study methodology, conclude that stock markets prefer focused M&A transactions over diversified ones. Target shareholders receive higher returns when the deal is more diversifying. Bidders are more successful in the activity focused than diversifying deals, and in the geographically focused transactions compared to crossborder or cross-state deals, whereas targets seem to create more value in cross-border transactions. Expected performance following an FI merger play a vital role too; risk reduction potential through diversification, profit and cost efficiencies (cost-to-asset-ratio, returns on assets and equities). DeLong (2001b) examines the differential in stock market reactions to U.S. bank diversification and focus announcements. Results emphasise on the positive response of stock markets towards deals that tend to focus, both activity and geography, while the other types of M&As do not create value.

---

<sup>19</sup> They analyse 98 targets out of 24 countries worldwide being acquired by 98 European banks out of 17 European countries (EU-15 + Norway + Switzerland) between 1985 and 2000.

Williams and Liao (2008) and Bellotti and Williams (2008)<sup>20</sup> examine cross-border bank M&A deals that took place between 1998 and 2005. They find value creation and significant abnormal returns pattern for target banks, value destruction for bidder banks, but not if the activity is focused. These results contradict with Cybo-Ottone and Murgia (2000). They examined the market reaction to European FIs M&A took place between 1988 and 1997, showing that European financial market positively appreciates bank consolidations that aim at activity focusing deals and those that diversify towards only insurance activities. The combined performance of both bidders and targets is statistically significant for those deals. However, bank diversification towards securities firms or foreign institutions results in zero or negative returns for bidders, and narrow positive with lower significance for targets.

The divergence between results in Cybo-Ottone and Murgia (2000) and Williams and Liao (2008) and Bellotti and Williams (2008) studies are because of several factors. Methodologically, the estimation and event windows differ (long versus short; 140 days compared to 30 days). Empirically, Williams and Liao (2008) and Bellotti and Williams (2008) examine M&A events between 1998-2005 during which the 2000 recession and the 2001 dotcom bubble occurred, affecting stock prices on a large scale<sup>21</sup>. While the later study covered the years between 1988 and 1997, coinciding with

---

<sup>20</sup> 74 cross-border M&A transactions in which international banks acquired ownership stakes in 46 listed banks in emerging market economies (EME). A total of \$1,057,515 million of bank assets were acquired for \$38,172 million in Latin America, Central and Eastern Europe, and Asia.

<sup>21</sup> Financial markets are more likely to witness slower consolidations during recessionary periods due to shortages in funds in general and in the interbank market specifically. At the same time, consolidations happen more rapidly and in bigger deal sizes as a result of restructuring regulations. However, the dotcom bubble is assumed to have promoted the online practice of businesses and banks which contributes to more diversification oriented consolidations.

the Asian financial crisis<sup>22</sup>. Furthermore, target countries examined in the Williams and Liao (2008) and Bellotti and Williams (2008) studies are in emerging markets that include Russia. Russia was experiencing a financial crisis during 1998, which could have shifted any neutral or positive returns to turn negative.

Bessler and Murtagh (2002), in their investigation of the Canadian financial system, supported the theme that foreign acquisitions in the insurance sector do not create value. They also reported that M&A deals involving a foreign commercial bank, as the bidder, and domestic wealth management or retail bank, as targets, do create value. For domestic FIs M&A, commercial banks diversification into insurance creates value, while commercial banks to local wealth management and retail banking diminished or did not create value. DeLong (2001a) and (2003) confirm these results are valid in U.S. bank mergers during 1991 and 1995. Their results support the assumption that markets reward mergers that focus their geography and activity and can enhance the long-term performance of banks and financial institutions. A significant difference that could have led to the inconsistency between DeLong (2001a) and (2003) and Bessler and Murtagh (2002) is in the interpretation of geographic diversification in each of these studies. Mainly the borders and boundaries between jurisdictions and the regulatory frameworks differences between European countries – banks and the European bank on one side, and United American states-banks and the Federal reserve banks.

Amihud *et al.* (2002) and Beitel *et al.* (2004) examine European financial markets mergers. They report that the effects of cross-border mergers on returns of acquiring banks are significantly negative. Beitel *et al.* (2004) propose that activity focus and geographic focus significantly drive

---

<sup>22</sup> Asian banks were targets in Williams and Liao (2008) and Bellotti and Williams (2008) studies, and the Asian crisis contributed to having cheaper deals of M&As with industrialised countries banks due to capital migration and lower value of local currencies.

M&As and that high diversification impacts negatively the value creation for the bidding FIs. They argue that, from a combined point of view, the diversification hypothesis cannot be supported for European bidding banks and that non-diversifying transactions significantly create more value than diversifying transactions. Campa and Hernando (2006) diverge significantly from these results. Their analysis of 244 bank merger deals in the European countries (EU15) reports having lower excess returns for targets when the target is cross-border<sup>23</sup>. This conclusion contradicts with Lepetit *et al.* (2004), who confirms the existence of a positive and significant increase in value for target banks among all deals. However, they find positive and significant market reaction exists in cross-product diversification and geographic specialisation but not activity-focus deals.

In the USA financial market, Fields *et al.* (2007) report positive and significant abnormal returns for banks bidding for a bancassurance merger. This positivity further extends to finding low risk transmitted from insurance targets to bidding banks. Results coincide with the international evidence provided by Dontis-Charitos *et al.* (2011). They emphasise that bancassurance announcements lead to positive market reactions around the event days and create wealth for the bidding banks into insurance, but not vice versa. Factors that lead to this resolution are related to the expectations of financial markets; to the combined entity profile of being able to extend and expand markets, benefitting from economies of scale and scope. The study also reveals that geographic focus or diversification is highly dependable on the language barrier. Dontis-Charitos *et al.* (2011) argue that English speaking bank-insurance ventures tend to reap positive excess returns because regions sharing the same language tend to interrelate via similar cultural, trade practices, business ethics and

---

<sup>23</sup> Where cross-border in this context refers to the political border of countries but still within the EU where financial institutions enjoy the usage of one currency and almost unified sets of rules with certain discrepancies.

legal backgrounds, an outcome that is consistent with European studies. Ekkayokkaya *et al.* (2009) conclude that diversifying deals are value-enhancing and remain unaffected by the introduction of the Euro currency, while focused bids generated losses in the post-euro introduction phase. Chen and Tan (2011) confirm the same for the European FIs mergers. Positive cumulative abnormal returns (CARs) are observed for bidders, and two factors contributed to this; relative deal size and being a serial acquirer.

Therefore, a theoretical analysis of bank M&As reports mixed results and sometimes conflicting results for the same markets. Empirical studies have not concluded on stock market reaction to mergers various types and orientations of mergers, nor on how accounting measures of performance adjust in direction and level. Some support bank activity and/or geography diversification, while others support geographic diversification, but combined with activity focus. Hence, this study follows a two steps approach investigating:

- Shareholders value adjustment; in response to FIs M&A deals announcements in the immediate event window **and** in extended event windows through Buy and Hold abnormal returns.
- Accounting measures performance; comparison of post-merger to pre-merger, including several cash flow measures and not just profitability measures, as the empirical literature review suggest.
- Which FIs mergers orientations of diversification and focus create more value for shareholders (in the immediate announcement window and several months afterwards) and/or generates better cash flows, profitability and less credit risk.

Investigating the above pillars would contribute to the renewed policy debate on the optimum Financial Sector (FIs and bank's) structures that can best create value for shareholders and prevent risk propagation in a scrutiny of the diversification hypothesis.

## 2.3 Data and Methodology

This study contributes to identifying the market-product developing strategy that creates the best value for shareholders and for merging firms<sup>24</sup>. The market-product development strategies are scaled over the Ansoff's (1980) matrix of:

- a) Market Penetration where an FI merges with another FI that conducts the **same portfolio** of business in the **same jurisdiction**.
- b) Market Development; where an FI merges with another FI that conducts the **same portfolio** of business in a **different jurisdiction**.
- c) Product Development; where an FI merges with another FI that conducts a **different portfolio** of business in the **same jurisdiction**.
- d) Diversification (or conglomeration in FIs terminology); where an FI merges with another FI that conducts a **different portfolio** of business in a **different jurisdiction**.

### 2.3.1 Data Sample

The dataset comprises publicly traded financial institutions mergers and acquisitions that took place between 1992 and 2018<sup>25</sup>. Where the merger leads the acquiring FIs to increase their existing

---

<sup>24</sup> The classification follows a deductive approach towards strategic orientation, i.e. all mergers are filtered and sorted into activity focus (Comm. Bank to Comm. Bank, or Insurance to insurance...) and activity diversification (comm. Bank to an Ins. Company). Then then a different filter and categorisation is conducted to differentiate among geographical focus and geographical diversification (over countries and states in the case of the US). The strategic orientation is then built on how the activity and geography orientation emerge for every deal. For example, a deal that was focus in the activity and focus in the geography would mean market penetration, and the regression and analysis proceed on the bases of this strategic orientation. Although this explained categorically in every chapter, a new footnote will restate the above explanation again.

<sup>25</sup> The dataset here covers 28 years of several FIs mergers and acquisitions waves; 1995-1997, 1997-2002, 2002-2007, and 2009-2013 following innovation and deregulation (Martynova and Renneboog, 2008), along with several re-regulation moves in the aftermath of 2008-2011 crisis, and recent calls of deregulating ring-fencing Acts.

ownership in the Target FIs from the range of 0% - 20% targeting the 51 - 100% range. A significant advancement over the current literature is in assessing mergers, not only for bank bidders but also for the three pillars of the financial sector. Therefore, mergers where the bidder is a bank; bank-bank, bancassurance, bank-real estate, and bank-investment (company or bank) mergers, in addition to mergers where bidders are FIs (Insurance, Real Estate or Investment banks/companies) that acquired a bank are scrutinised. This approach makes it the most comprehensive data set and most accommodating among studies that explored the impact of bank M&As on shareholder value.

Stock prices of FIs institutions are procured from Bloomberg using Bloomberg Industry Classification Systems (BICS) Ticker code of FIs that took part and completed an M&A deal. Deal size is set to be greater than or equal to \$U.S. 100 Million. Because smaller transactions are usually done by specialised boutique firms where the ambiguity of payment and reporting methods increases (Beitel and Schiereck, 2001). Additionally, deals that are over 100 million dollars are likely to have a high 'institutional presence' in deal commissioning and negotiation (John *et al.*, 2014)<sup>26</sup>. The following tables provide a summary of the total number of deals and respective total values and deals distribution of the sample over the selection criteria.

---

<sup>26</sup> Typically, the big firms will compete most aggressively for exit transactions above \$100 million because these transactions will produce several million dollars in fees. Beitel and Schiereck (2001) also argue that, in their 2002 study, the 33 smallest deals that are of value between USD 100 million and USD 449 million do not show any significance at all, which make it a range worth further examination.

*Table 2-1 Bank Mergers deals' descriptive statistics of the number of deals, deal value and strategic orientation.*

Year	Value in \$US Mil.	Number of Deals	Region	Value in \$US Mil.	Number of Deals
1995	2008.35	1	North America	814763.23	553
1996	5218.69	4	Australasia	389439.44	333
1997	9754.37	2	Africa	8104.87	22
1998	208155.3	43	Europe	816281.88	517
1999	122661.52	61	Latin America	56171.65	60
2000	98842.01	61	<b>Total</b>	<b>2084761.07</b>	<b>1485</b>
2001	115484.31	81			
2002	49501.55	55			
2003	129959.35	88			
2004	129990.48	90			
2005	132377.57	90	<b>Geographic Orientation</b>	<b>Value in \$US Mil.</b>	<b>Number of Deals</b>
2006	223071.92	141	Intrastate US	206053.1	162
2007	172871.08	113	Cross-border	792906.83	741
2008	105032.38	64	Local	630031.17	351
2009	46797.24	49	Cross-State US	455769.97	231
2010	94645.46	64	<b>Total</b>	<b>2084761.07</b>	<b>1485</b>
2011	39764.96	37			
2012	38010.28	46			
2013	44341.08	65			
2014	72453.88	88	<b>Strategic Orientation</b>	<b>Value in \$US Mil.</b>	<b>Number of Deals</b>
2015	107213.03	77	Market Penetration	1228786.97	697
2016	82627	82	Product Development	63067.27	47
2017	44963.22	74	Market Development	703280.43	601
2018	9016.04	9	Diversification	89626.4	140
<b>TOTAL</b>	<b>2084761.07</b>	<b>1485</b>	<b>Total</b>	<b>2084761.07</b>	<b>1485</b>

This table shows distribution of number and monetary value of deals over years from 1995 to 2018 (no deals met the threshold of \$US Mil. 100 between 1992 and 1994). It also shows the distribution over the main regions of North America, Australia, Latin America, Europe And Africa. The geographic orientation panel differentiates between the US mergers and rest of the world mergers, and between intrastate and cross-state mergers in the US. Strategic orientation panel shows high popularity of market penetration and market development strategies of FIs mergers, over diversification.

*Table 2-2 Financial institutions' mergers deal orientation.*

<b>Product Orientation</b>	<b>Value in SUS Mil.</b>	<b>Number of Deals</b>
<b>Banks-Banks</b>	1187129.79	657
<b>Banks-Insurance</b>	27334.31	30
<b>Banks-Real Estate</b>	30957.28	54
<b>Banks-Investment Company</b>	2547.23	9
<b>Insurance-Banks</b>	31675.68	12
<b>Insurance-Insurance</b>	489376.11	293
<b>Insurance-Real Estate</b>	10002.22	38
<b>Insurance-Investment Company</b>	10938.51	4
<b>Investment Company-Banks</b>	2660.87	3
<b>Investment Company-Insurance</b>	14009.31	5
<b>Investment Company-Real Estate</b>	5234.86	8
<b>Investment Company-Investment Company</b>	5641.76	10
<b>Real Estate-Bank</b>	0	0
<b>Real Estate-Insurance</b>	0	0
<b>Real Estate-Real Estate</b>	249919.74	338
<b>Real Estate-Investment Company</b>	17333.4	24
<b>Total</b>	<b>2084761.07</b>	<b>1485</b>

This table shows the distribution of deal numbers and values of FIs mergers examined over the product/activity orientation of the acquirers and targets. Deals where a bank is the bidder totals 750 deals with 50% of the value of all deals. Adding deals where banks were another party of the deal would make total number of mergers with a bank in the deal above 51% and more than 61% value.

### **2.3.2 Methodology**

This study examines financial institutions merger effect on bidders' shareholder's value and their observed performance. This examination deploys three techniques simultaneously:

1. An event study analysis; to estimate and calculate abnormal returns (ARs) and cumulative abnormal returns (CARs) in the narrow windows of the merger announcement.
2. Buy and Hold event study analysis; to estimate abnormal returns in the broader window of the event, +50 to +230 days after the merger announcement.
3. Observed performance analysis of financial and capital efficiency measures; before and after the merger announcement, return on equity (ROE), Liquidity, the cost to income ratio, capital to total assets ratio, net loans to total loans, credit risk, Loans to deposits ratio, other expenses and total assets, Economic value addition (EVA), the weighted average cost of capital (WACC) and return on invested capital (ROIC).

Deal Criteria of value (Mega-deals) strategic orientation (as in Ansoff (1980) growth strategies), acquiring bank size, and payment method are all set as individually as control variables. Deal Value describes the total declared value of the deal summarising acquiring and target institutions' total valuations of assets, debts and intangibles. To account for qualitative aspects, a dummy variable is devised to describe; Mega Deals (value=1 if the deal value is greater than USD 10 billion and zero otherwise). Differentiation is also made among deals for the 'payment type' used to settle the deal; Cash, Stocks, Cash And Stocks, Cash Or Stocks, Debt, Cash and Debt, Stock and Debt and Undisclosed (116 cases).

### **2.3.2.1 Event Study; Market Perception**

The event study methodology had undergone several developmental phases from when it was initially conceived to examine stock market behaviour in response to stock splits with Dolley (1933). Modern event studies are conducted on the groundwork of Ball and Brown (1968) and Fama *et al.* (1969). Although they were conducted three decades earlier, they, along with others, still have contributed to enhancing event study methodology to the way it is currently practised<sup>27</sup>.

The purpose of the event study methodology is to measure abnormal returns (AR), that are the deviation of actual stock returns from expected stock returns estimated over the MSCI index, as a result of an event, to account for the impact of this event on firms' stock prices. These ARs represents the magnitude of shareholders value maximisation (positive or negative) created following the event. Under the “agency problem” theory and the “hubris hypothesis”, an intended M&A does not necessarily imply that the management aims to maximise shareholders wealth<sup>28</sup>. In the context of this study, the event is the merger or acquisition announcements of financial institutions that took place between 1993 and 2018, and that are above \$US 100 million in deal value.  $H_0$  states that markets are not affected by banks' M&A announcements. Alternative hypothesis  $H_1$ , testifies that markets are affected by banks M&A announcements, and enables measuring the magnitude of this effect to

---

<sup>27</sup> Brown and Warner (1985) worked on making event study methodology more statistically valid through enhancing the rigor of models used and its significance testing (focusing on performance problems in monthly data and daily data separately that are also enhanced through Kothari and Warner (2007) by resolving methodology issues of events clustering, abnormal returns aggregation and variances changing.

<sup>28</sup> If the utility function of the management of the acquiring firm is increasing proportionately to the scale of the bank, it is likely for management to proceed with the merger for personal benefit without considering the real cost involved, which may be higher than the value of the target bank itself. A similar case arises when the management of the bidder overestimates its own ability to identify undervalued target banks, thus paying a relatively high price (“hubris hypothesis”) (Roll, 1986, 1993; Asimakopoulos and Athanasoglou, 2013).

differentiate how various bidding and target FIs shares react towards various deals types of focusing and diversifying activities and/or geography.

Therefore, abnormal returns  $AR_{i,t}$  for institution  $i$  at time  $t$  are the difference between its actual returns  $R_{i,t}$  and its expected returns  $E(R_{i,t})$  estimated using the market model that OLS regresses returns in the estimation window over the MSCI market  $M$  returns  $R_{M,t}$  ;

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (2.1)$$

Where

$$R_{i,t} = \alpha_{i,t} + \beta_i R_{m,t} + \varepsilon_{i,t} \quad (2.2)$$

Hence,

$$AR_{i,t} = R_{i,t} - \hat{\alpha} - \hat{\beta} R_{m,t} \quad (2.3)$$

Then aggregate  $ARs$  to find cumulative abnormal returns  $CAR$  to check for their magnitude and significance accept or reject the  $H_0$ .

In this study, the analysis is based on an estimation period of 200 trading days (-241 to -41) before the event announcement(s) ( $t = 0$ ), leaving an 81-day (-40, + 40) window for the event study period. This estimation window should balance the trade-off between the reasonable length (to provide sufficient time to identify 'typical' returns patterns) and sample size and at the same time as a precaution against contamination or noise in longer windows. Long estimation windows will, in general, increase the precision parameters, but not longer than 300 days before the event window as

this might lead to a structural break<sup>29</sup> in the sample (Armitage, 1995). Average abnormal returns are then aggregated for each day in the event window using equation (4). This method aggregates the abnormal returns for the  $N$  number of stocks to find the average abnormal return at time  $t$  for every stock  $i$ .

$$AAR_t = \frac{\sum_{i=1}^N AR_{i,t}}{N} \quad (2.4)$$

Another aggregation takes place for average abnormal returns over the  $t$  days in the event windows  $T$  to form the cumulative average abnormal return (CAAR) equation (5).

$$CAAR_T = \sum_{t=1}^T AAR_t \quad (2.5)$$

The CAAR is a useful measure because it helps to get a sense of the aggregate effect of the M&A announcements in the sample, particularly if the influence of the event during the event window is not exclusively on the event date. In the literature, various calculation periods of the cumulative abnormal returns are employed. The present study, in addition to the examination of the announcement date ( $t_0$ ;  $[0, 0]$ ) reaction, utilises the  $[-1, +1]$ ,  $[-1, +3]$ ,  $[-1, +5]$  days event windows to validate the results for the immediate and short-term windows response.

### **2.3.2.2 Buy and Hold Abnormal Returns**

---

<sup>29</sup> Extended estimation windows increase the likelihood of having a structural break where an exogenous factor (economic, financial or even political and security) affect the market and adjust expected returns calculation.

An expansion over the current literature is to utilise Buy and Hold Abnormal Returns (BHAR) to examine event impact on acquirers returns over the longer run; event windows of [-50, +50], [-50, +80], [-50, +110], [-50, +140], [+1, +200] and [+1, +230] days windows<sup>30</sup>. The Buy and Hold methodology employs geometric returns, rather than arithmetic returns in calculating the overall return over the event period of interest, allowing for compounding, whereas the CAR does not (Brooks, 2013). BHARs are defined as the difference between the realised buy-and-hold return and the normal buy-and-hold return;

$$\mathbf{BHAR}_{i(T_1, T_2)} = \prod_{t=T_1}^{T_2} (1 + R_{i,t}) - \prod_{t=T_1}^{T_2} 1 + E[R_{i,t}] \quad (2.6)$$

Mean Buy and Hold Abnormal Returns would be

$$\overline{\mathbf{BHAR}_{i(T_1, T_2)}} = \frac{\sum_{i=1}^N \mathbf{BHAR}_{i(T_1, T_2)}}{N} \quad (2.7)$$

The *t*-test is applied, in time series and cross-sectionally, to test for the statistical significance of the AAR and CAAR using the following equation; where  $t_1$  and  $t_2$  are time references for the days of the window and Count ( $t_1, t_2$ ) is the number of days in this window.

$$t - stat = \frac{CAR[t_1, t_2]}{\left( \frac{1}{N^2 \sum_{i=1}^N \sigma_i^2} \right)} \quad (2.8)$$

---

<sup>30</sup> The long horizon BHAR starts from 50 days before the announcement, because normally Initial Price Offerings are submitted, confidentially, within 50 days from the announcement (Bloomberg, 2017). However, in the 1990s it used to be around 6 months. A period longer than 50 days prior announcement would capture several other market effects on the firms that can affect its pricing or mispricing (Chen *et al.*, 2018; De and Jindra, 2012; MacKinlay, 1997).

To handle any potential cases of normality<sup>31</sup> in the distribution of ARs, effects of outliers, cross-sectional correlation of ARs and distortions from event-induced volatility posed by event date clustering (Rezitis, 2008; Hernando *et al.*, 2009; Knapp *et al.*, 2006), the BMP Boehmer *et al.* (1991) test is applied.

$$BMP = \frac{SCAR_{t_1,t_2}}{\frac{1}{N^2} \sum_{i=1}^n (SCAR_{t_1,t_2} - \overline{SCAR_{t_1,t_2}})^2} \quad (2.9)$$

Where the standardised CAR is  $SCAR_{t_1,t_2} = \frac{CAR_{t_1,t_2}}{\sigma_{it_{t_1,t_2}}}$ , and  $\sigma_{it}$  is estimated by the market model as  $(t_2 - t_1 + 1) \cdot \sigma_{ei}^2$ .

In addition to the BMP test, to verify the results, the nonparametric tests of Corrado (1989) and sign tests are also employed. These tests have the advantage that; they do not consider the abnormal returns distribution. Using ranks neutralises the statistical effect (such as outliers, skewness, etc.) of abnormal returns. Each FI's abnormal return for the whole period of the study (estimation and event period) is assigned a rank, starting with the rank of one for the lowest abnormal return. Then, the ranks in the event period for each firm are compared with the expected average rank under the null hypothesis of no abnormal returns. Assuming that  $\overline{Kit}$  is the rank for bank *i* at time *t* and *T* is the

---

<sup>31</sup> These further reassessments are to account for the non-normal distribution of security returns, possible sensitivity of inference to the effects of outliers, cross-sectional correlation of ARs and distortions from event-induced volatility changes posed by event date clustering (Rezitis, 2008; Hernando *et al.*, 2009; Knapp *et al.*, 2006). Normality tests used are based on Jarque-Bera (1981), Shapiro-Wilk (1965) and Doornick-Hansen (1994).

number of observations for the estimation and event period, the average expected rank for a bank  $i$  is  $\overline{K_i} = 0.5 + Ti/2$ . Hence, Corrado (1989) test C would be;

$$C = \frac{\frac{1}{N} \sum_{i=1}^N (K_{i0} - \overline{K_i})}{\sqrt{\frac{1}{T} \sum_{t=1}^T \frac{1}{N^2} \sum_{i=1}^N (K_{i0} - \overline{K_i})^2}} \frac{1}{\sqrt{L}} \quad (2.10)$$

Furthermore, the significance test utilises the Generalised Sign (GS) Test proposed initially by Cowan (1992). It is based on the ratio of positive cumulative abnormal returns  $P_0^+$  over the event window. Under the null hypothesis, this ratio should not systematically deviate from the ratio of positive cumulative abnormal returns over the estimation window  $P_{Est.}^+$ . Since the ratio of positive cumulative abnormal returns is a binominal random variable, the GS test statistics would be:

$$t_{GS} = \frac{P_0^+ - P_{Est.}^+}{\sqrt{P_{Est.}^+ (1 - P_{Est.}^+) / N}} \quad (2.11)$$

Since Buy and Hold abnormal returns are often positively skewed (Barber and Lyon, 1997; Kothari and Warner, 1997), a skewness-adjusted t-test, developed by (Johnson, 1978) is applied;

$$T_{Skewness-Adjusted} = \sqrt{N} \left[ S + \frac{1}{3} \hat{\gamma} S^2 + \frac{1}{6N} \hat{\gamma} \right] \quad (2.12)$$

$$\text{where } S = \frac{\overline{BHAR}_{i(T_1, T_2)}}{\hat{\sigma} BHAR} \text{ and } \hat{\gamma} = \frac{\sum_{i=1}^N [BHAR_{i(T_1, T_2)} - \overline{BHAR}_{i(T_1, T_2)}]^3}{N \hat{\sigma}^3 BHAR}$$

### 2.3.3 Observed Performance

In an approach of “strategic performance” similar to the one adopted by Chatterjee *et al.* (1992), Ramaswamy (1997) and Altunbas and Ibanez (2008), this chapter examines strategic variables of financial institutions and their changes from pre-merger to post-merger. The model links performance

adjustment pre- and post-merger to a strategic indicator and a set of control variables that are likely to influence performance. Hence, strategy scholars have used resource allocation frontiers as indicators of the underlying strategies that firms adopt (Ittner *et al.*, 2003; Powers and Hahn, 2004; Leitner and Guldenberg, 2010; Zajac and Shortell, 1989; Dess and Davis, 1984). For example, FIs undertook a cost-efficiency strategy show lower levels of operational expenditure to total assets compared to other firms.

Similarly, institutions with product development/innovation strategies exhibit higher levels of research and development expenditure (Damanpour and Gopalakrishnan, 2001; Ramaswamy, 1997; Reidenbach and Moak, 1986). Therefore, the concepts of strategic choices of the market and/or product development (Ansoff, 1980) assume that the significant aspects of FIs strategic orientation can be seen in the resources allocation decisions that managements make. This study examines the strategic features of FIs engaged in a merger with another FI that pursuit Investment, Insurance, Commercial banking or real estate as lines of business. Balance sheet, income statement and cash flow items are downloaded, using FIs tickers, from Thomson Reuters Datastream. Ratios of profitability, liquidity, credit risk, capital structure and efficiency and outputs of loans are then calculated for two and one year(s) before the merger announcement, the year-end of the merger announcement, and one and two years after merger announcement and completion<sup>32</sup>.

The value creation of bank mergers is also examined through analysing Economic Value Addition (EVA), which is a measure of a company's financial performance based on the residual

---

<sup>32</sup> A two-year time window is considered for several reasons. Considering a longer time span can bring distortions to the results stemming from other economic factors, and when considering a longer time span the sample size shrinks dramatically particularly for the case of cross border mergers and with mergers completed after Q2-2016.

wealth calculated by deducting its cost of capital from its operating profit and adjusted for taxes on a cash basis. EVA can also be referred to as economic profit, as it attempts to capture the true actual economic profit of a company. This measure has been devised by a management consulting firm Stern Value Management, incorporated initially as Stern Stewart and Co and published in the Journal of Applied Corporate Finance (Stern *et al.*, 1995). EVA measures the wealth an FIs creates (or destroys) each year. It is a company's after-tax profit from operations minus a charge for the cost of all capital employed to produce those profits – not just the cost of debt, but the cost of equity as well. EVA is the incremental difference in the rate of return over a company's cost of capital. Principally, it is used to measure the value FIs and banks generate from funds invested into it (Chen and Dodd, 1997; Kan and Ohno, 2012). This tactic also contributes to examining the possibility that financial firms are “shareholder value-efficient” (Fiordelisi, 2007). If EVA is negative, it means the company is not generating value from the funds invested in the business. Conversely, a positive EVA shows an FI is producing value from the funds invested in it. Hence,

$$EVA_{t-1,t} = NOPAT_{t-1,t} - (IC_{t-1,t} * K_{t-1,t}^e) \quad (2.13)$$

Where;

NOPAT is the Net Operating Profits after Tax, IC=Invested Capital and  $K_{t-1,t}^e$  is the estimated cost of capital (See Chapter 2 Appendix for details).

Hence, the success of merger deals could be seen through other determinants that have well performed in several time terms after the deal. For instance, performance is examined 20 and 40 days after announcement through CAR, at year-end for the whole financial year performance, by comparison of the post and pre-event year-end measures, sustainability growth rate and economic value addition. **Table 2-3** below shows these variables and their specific codes.

**Table 2-3 Accounting/financial and efficiency and capital performance variables; and their sources, codes and their formulae of calculation.**

Variables	Labels	ID-Codes	Sources
ROE	Return on Equity - Total (%)	WC08301	DataStream - Thomson Reuters Profitability Ratio, Annual & Interim Item
Liquidity	Liquid (Current) Assets / Total Deposits	WC02201 / WC03019	DataStream - Thomson Reuter. Liquidity Ratio
Cost to Income Ratio	Cost (Operating Expenses) / Revenue (Sales)	WC01051 / WC01001	DataStream - Thomson Reuter - Efficiency Ratio
Capital to Total Assets Ratio	Total Capital / Total Assets	WC03998 / WC02999	DataStream - Thomson Reuter - Capital Ratio
Net Loans to Total Assets	Net Loans / Total Assets	WC02276 / WC02999	DataStream - Thomson Reuter - Assets (Banks) – Liabilities (Other FIs) to total Assets
Credit Risk	Loan loss provision/Net interest revenues	WC01271 / WC01076	DataStream - Thomson Reuter - Credit Exposure
Loans to Deposits Ratio	Customer Loans / Customer Deposits	WC02266 / WC03019	DataStream - Thomson Reuter - Assets to Liabilities, Income efficiency
Other Expenses to Total Assets	Other Expenses / Total Assets	WC03069 / WC02999	DataStream - Thomson Reuter - Non-operating expenses to total Assets
EVA	Economic Value Addition	Calculate Net Operating Profit After Tax (NOPAT), Calculate Total Invested Capital (TC), Determine a Cost of Capital (WACC), Calculate EVA = NOPAT – WACC% * (TC)	Bloomberg - WACC ECON VALUE ADDED
WACC	Weighted Average Cost of Capital	Multiply the cost of each capital component by its proportional weight, take the sum of the results. Multiple by 1 - Corporate tax rate.	Bloomberg - WACC
ROIC	Return on Invested Capital	Net Operating Profit After Tax (NOPAT) divided by Invested Capital which is calculated by subtracting cash and non-interest-bearing current liabilities (NIBCL) – including tax liabilities and accounts payable, as long as these are not subject to interest or fees – from total assets.	Bloomberg - RETURN ON INV CAPITAL

This table shows accounting / financial and efficiency and capital performance variables; and their sources, codes, formulae of calculation. Below are further notes on the data availability and what some data mean to different types of financial institutions: Banks, Insurance companies, Investment companies and real estate firms. There also considerations of the variations of reporting standards in different jurisdictions and this has been adjusted for.

**Notes:**

CURRENT ASSETS - represents cash and other assets that are reasonably expected to be realized in cash, sold or consumed within one year or one operating cycle. Generally, it is the sum of cash and equivalents, receivables, inventories, prepaid expenses and other current assets. DEPOSITS - represent the value of money held by the bank or financial company on behalf of its customers. The item includes demand, savings, money market and certificates of deposit along with foreign office and deposit accounts. Excluded are securities sold under repurchase agreement. COST OF GOODS SOLD - If a breakdown of total operating cost of non-manufacturing companies is not available then it is treated as cost of goods sold. For Utilities and Service (Financials) Organizations, if there is no clear breakdown between cost of goods sold and Selling, General and Administrative Expenses, the total amount is updated to Cost of Goods Sold and noted that Selling General and Administrative Expenses are included. Service Organizations may refer to this as Cost of Services. REVENUES represent the total operating revenue of the company. TOTAL CAPITAL represents the total investment in the company. It is the sum of common equity, preferred stock, minority interest, long-term debt, non-equity reserves and deferred tax liability in untaxed reserves. For insurance companies' policyholders' equity is also included. TOTAL ASSETS represent the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets. LOANS -represent the total amount of money loaned to customers after deducting reserves for loan losses. For Banks: It includes but is not restricted to: Lease Financing Total non-performing assets (field 02287) For Other Financial Companies: It includes but is not restricted to: Lease Financing Finance Receivables. Provision for Loan Losses Expense: represents losses that the bank or the company expects to take as a result of uncollectable or troubled loans. NET INTEREST INCOME represents the difference between the total interest income and total interest expense of the bank. CONSUMER & INSTALLMENT LOANS represent loans made to consumers. It includes but is not restricted to: Auto loans Home improvement loans Credit cards Home equity loans. OTHER EXPENSES (ACCRUED) represent those accrued expenses not included in accrued payroll, interest payable, dividends payable or income taxes payable.

## 2.4 Results

The data set covers 1485 Financial Institution mergers. **Table 2-4** below shows financial accounting data aggregated for all the 1,485 acquiring financial institutions. Panel A shows mean, median and standard deviation, while panel B shows the change of these variables between the year of the merger and the following one year and two years, and between one-year post-merger and one-year pre-merger. Over 64% of FIs mergers are completed within the same year of the announcement, and around 35% are completed the following year. Hence presenting the change in financial performance between the year before the announcement and the years of announcement/completion (Year0 & Year+1).

Table 2-4 Summary Statistics of performance independent variables of acquiring financial institutions.

	Panel A					Panel B		Panel C		Panel D	
	Overall - Announcement Year					Year-1 to Year0		Year-1 to year+1		Year0 to Year+1	
	Minimum	Mean	Median	Standard Deviation	Maximum	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
ROE (%)	-147.31	16.04747	11.99	87.28081	2081.58	4.836162	126.6072	0.5152578	136.7969	-4.365894	58.84347
Liquidity Ratio	0	7.334146	0	105.0997	2648.08	2.462083	71.91184	1.638365	56.50162	-0.8232744	17.24736
Cost to Income Ratio	0	4.879855	0	73.8148	2613.793	-0.4202141	18.51079	-1.754041	48.37297	-1.308222	30.68922
Capital to T. Assets Ratio	-0.9642339	0.300867	0.1813159	0.2729014	0.9903513	0.0055373	0.0863282	0.0119797	0.1390207	0.0063059	0.0888036
Net Loans to T. Assets Ratio	0	2.458851	0.4556544	24.17902	499.1742	-3.960558	146.8093	-3.958632	139.9671	-0.0068874	11.18887
Credit Risk	-1.850633	0.1600625	0.1015299	0.5022396	11.92982	0.0050678	0.3352252	-0.0544893	0.5793774	-0.0594155	0.6227569
Loans to Deposits Ratio	0	0.1727789	0.0928429	0.4953338	8.808624	0.0165561	0.3237131	0.0386346	0.7604965	0.0210473	0.44743
Other Expenses to T. Assets Ratio	-0.0184679	34.67977	0	462.74	14802.22	3.317548	153.2768	-5.984468	192.6764	-13.07026	288.618
T. Assets (\$USD)	0	2,270,000,000	43,500,000	15,900,000,000	286,000,000,000	196,000,000	8,280,000,000	694,000,000	5830000000	306000000	3,540,000,000
EVA	-4,578,022	-8,023.882	-168.7422	331,923.3	4,458,221	5,582.359	503,668.8	-6,834.715	373,987	-16,686	527,118.1
WACC	0.6606	6.707495	6.36265	2.606745	22.1827	0.0486724	1.555834	4.315223	136.6959	3.950648	130.8775
ROIC	-38.0378	8.428836	5.52855	13.23517	162.6085	0.0914401	10.75467	-0.015585	15.2451	0.242973	19.30301

This table presents the summary statistics of Financial Institutions' performance and activity ratios. Panel A presents the overall statistics at the end of the year of announcement, while panel B shows the change between the year of announcement and the previous year's performance. Panels C and D presents the change in performance indices from a year before to a year after and the year of and the year after the announcement. ROE (%) is the Return on Equity - Total (%), Liquidity Ratio is (Current) Assets divided by Total Deposits(banks) or money held by the financial company (non-bank FIs) on behalf of its customers. , Cost to Income Ratio is Operating Expenses divided by Revenue (Sales), Capital to Total Assets Ratio is the Total Capital divided by Total Assets, Net Loans to Total Assets is the Net Loans divided by Total Assets, Credit Risk is the Loan loss provision divided by Net interest revenues, Loans to Deposits Ratio is the Customer Loans divided by Customer Deposits, Other Expenses to Total Assets is the Other Expenses divided by Total Assets, EVA is the Economic Value Addition expressed in terms of Net Operating Profit After Tax (NOPAT), Total Invested Capital (TC), Cost of Capital (WACC) as  $EVA = NOPAT - WACC * (TC)$ . WACC is the Weighted Average Cost of Capital expressed as the sum product of the multiplication of cost of each capital component by its proportional weight and multiplied by 1 - Corporate tax rate. ROIC which is the Return on invested Capital expressed as Net Operating Profit After Tax (NOPAT) divided by Invested Capital which is calculated by subtracting cash and non-interest bearing current liabilities (NIBCL) – including tax liabilities and accounts payable, as long as these are not subject to interest or fees – from total assets. See Table 2-3 for sources of data collected for all Financial Institutions between 1990 (effectively 1995) and 2018.

Table 2-4A Descriptive statistics categorised over the acquirers' line of business.

variable	Acquirer is a Bank		Acquirer is in Insurance		Acquirer is in Investment (banking)		Acquirer is in Real Estate	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
ROE (%)	12.02726	10.0584	11.52889	9.46981	11.40641	17.47121	42.24148	243.0082
Liquidity Ratio	10.39742	126.1745	0.0425154	0.0415691	0	0	0	0
Cost to Income Ratio	11.4121	121.9013	1.986871	14.82231	0.328754	0.3784845	0.3861727	0.2430827
Capital to T. Assets Ratio	0.1609963	0.0655453	0.216928	0.151108	0.7566497	0.2593956	0.7506092	0.2149729
Net Loans to T. Assets Ratio	0.6227473	0.1464966	2.136513	14.58088	5.754783	35.2285	9.384498	54.62162
Credit Risk	0.1516741	0.5643376	-1.850633	0	0.2894092	0.0478788	0.1010996	0
Loans to Deposits Ratio	0.1560405	0.4390335	0	0	0.2647295	0.0137389	0.0462545	0
Other Expenses to T. Assets Ratio	19.49733	182.7682	7.450666	49.83422	140.0211	878.1266	65.81442	712.6497
T. Assets (\$USD)	1,760,000,000	15,100,000,000	2,260,000,000	15,500,000,000	3,540,000,000	20,000,000,000	193,000,000	879,000,000
EVA	-5,366.578	79,551.02	-11,672.62	608,532.2	-4,230.918	173,304.5	-3,369.476	34,327.67
WACC	6.368196	1.997821	8.083004	2.466471	6.817325	1.885305	5.955456	2.646619
ROIC	5.632036	4.169101	17.48247	21.90851	8.415366	12.47186	5.164424	5.67167

This table shows descriptive statistics of acquiring Financial Institutions' performance and risk variables, categorised over the industry of the acquirer, bank and non-bank financial institutions. ROE (%) is the Return on Equity - Total (%), Liquidity Ratio is (Current) Assets divided by Total Deposits(banks) or money held by the financial company on behalf of its customers. (banks) or money held by the financial company on behalf of its customers. Cost to Income Ratio is Operating Expenses divided by Revenue (Sales), Capital to Total Assets Ratio is the Total Capital divided by Total Assets, Net Loans to Total Assets is the Net Loans divided by Total Assets, Credit Risk is the Loan loss provision divided by Net interest revenues, Loans to Deposits Ratio is the Customer Loans divided by Customer Deposits, Other Expenses to Total Assets is the Other Expenses divided by Total Assets, EVA is the Economic Value Addition expressed in terms of Net Operating Profit After Tax (NOPAT), Total Invested Capital (TC), Cost of Capital (WACC) as  $EVA = NOPAT - WACC * (TC)$ . WACC is the Weighted Average Cost of Capital expressed as the sum product of the multiplication of cost of each capital component by its proportional weight and multiplied by 1 - Corporate tax rate. ROIC which is the Return on invested Capital expressed as Net Operating Profit After Tax (NOPAT) divided by Invested Capital which is calculated by subtracting cash and non-interest bearing current liabilities (NIBCL) – including tax liabilities and accounts payable, as long as these are not subject to interest or fees – from total assets. See Table 2-3 for sources of data collected for all Financial Institutions between 1990 (effectively 1995) and 2018.

Financial and accounting measures adjustments show, on average, improvements for acquiring FIs in the year of announcement<sup>33</sup>. Except for the economic value addition, which are negatives with significant standard deviation. Suggesting further examination of how different mergers types ad FIs create value through mergers. As over 99% of deals are completed in the same year of announcement or the following year, Panel B provides a more realistic summary of financial performance. The comparison between the year before the merger announcement and the year of the announcement (completion for 65% of deals) shows; positive return on equity enhanced liquidity and EVA. These figures prove the positive impact of mergers on FIs returns on equity and invested capital, leading to creating economic value (adding). However, the negative cost to income ratio reflecting cost deficiencies or income deterioration. Other expenses to total assets exhibit an increase; however, not necessarily reflect an increase in expenses rather the decrease in total assets as a signal of fixed assets disposal due to consolidations. Panel D shows that all financial variables exhibit positive change a year after the merger, except for EVA, which returned to the unfavourable position maintained in the year of the announcement. All the improvements are lead to more stable (lower variations-st.dev.) with higher medians models. This outcome suggests further examination of the “Shareholder value efficiency” (Fiordelisi, 2007). Hence the next stage of investigation examines shareholders value at various periods and in regression over financial/accounting indices.

Table 2-4A shows summary statistics of the mean and standard deviation of performance indicators segregated over the bidding institution industry. Data show that, on average, bidding real estate firms maintained the highest profitability by return on assets by merger year-end, compared to

---

<sup>33</sup> Especially, that after investigating the numbers and examining panel and literature it became clear that some ratio might have seemed strange because of the instance of the merger itself. Particularly, that these ratios are the merger year-end reporting where bidding FIs are having the targets assets, liabilities and operations being consolidated.

other FIs bidders. While bidding banks have the highest liquidity, accompanied by the highest cost to income. Primarily due to the nature of the banks conduct requiring more liquidity for cash on demand operations compared to other FIs. Notably, bidding investment banks had the most significant total assets, followed by insurance companies and real estate firms, with banks being the lowest. Combined with the highest liquidity ratio, banks maturity of funds management prefers and hold more liquid assets (loans) than fixed ones for solvency and meeting clients demands purposes. Bidding insurance firms and investment banks/firms seem to achieve a higher return on invested capital by the end of the merger year compared to other financial institutions.

#### **2.4.1 Shareholders value and FIs mergers**

Two years following the merger completion, bidders exhibit improvement in liquidity status and continued favourable capital structure. However, bidding FIs appear to have deteriorated returns on equity, the cost to income ratio and by sizeable economic value and total assets. Mainly reflecting, lower drive, or failure, to create value or enhance efficiencies after two years from the merger. It remains imperative to differentiate over the control variables associated with financial institutions mergers and acquisitions; focus vs diversification, deal value, regions and jurisdictions and payment types.

**Table 2-5** provides an analysis of how financial/accounting performance variables changes in response to FIs merger announcements over deal types; Diversification, Market Development, Market

penetration and product development<sup>34</sup>. Results show that market development through cross-border or cross-state deals provides the highest return on equity in the same year of the merger, 15.2%, followed by diversification at 11.89%. However, in the year following the merger, diversification continued to provide a positive return on equity while market development turned to negative ROE. Product development proved to be more profitable in the long run than in the short run and market development and market penetration. Return on Invested capital follows a similar paradigm. Liquidity and cost to income ratio improvements support market penetration, and not any of the geographic diversification options, especially in the year of the merger. Moreover, market penetration proves to be cost-efficient, even a year on the merger.

It is noticeable that in the Product Development category Cost-to-income ratio and other expenses to total assets ratio are of a different order of magnitude to the same ratios for the other three categories of mergers strategic orientation. This reflects the fact that this strategy of consolidation and business expansion delivers that most cost-effective route compared to other strategies. These cost savings are mostly realised through lower costs in marketing and branding strategies (as the brand is promoting in an existing market and only adding a product to the portfolio). Moreover, expansion strategies of diversification and market development are usually associated with greater risks (political and language), lower investors (shareholders) motivation and greater costs of marketing strategies and legal adaptation (Deng *et al.*, 2007; Elsas *et al.*, 2010; Meslier *et al.*, 2016).

---

<sup>34</sup> In the context of this study, Diversification means the acquiring FI merges or acquire another FI that is not structurally similar and pursue a different portfolio of income sources and in a different Jurisdiction. While Market Penetration refers to the merger of a structurally similar FI with similar sources of income in the same jurisdiction. Market development and product development follow the same analogy where the earlier describes similar FI merging but are in different jurisdictions, while the later describes non-similar FIs merger but in same jurisdiction. In US, cross state mergers are considered under different jurisdictions, hence they would be either market development or diversification.

Table 2-5 Financial Institutions performance change following different types of mergers.

Average performance indices during of the year of the merger announcement												
	ROE (%)	Liquidity Ratio	Cost to Income	Capital to T. Assets	Net Loans to T. Assets Ratio	Credit Risk	Loans to Deposits	Other Expenses to T. Assets Ratio	T. Assets (SUS)	EVA	WACC	ROIC
<b>Diversification</b>	11.88957	5.25729	1.547058	0.3156127	3.227559	0.1432772	0.1751621	21.68567	1,320,000,000	-10264.56	6.503536	6.534389
<b>Market Development</b>	15.18899	1.674125	1.931582	0.3122329	2.490353	0.1405702	0.2039176	20.97594	2,650,000,000	-78.6722	6.84195	8.528676
<b>Market Penetration</b>	18.00858	12.04362	8.385337	0.2908498	2.366538	0.1756581	0.1487379	51.45876	2,200,000,000	-6271.489	6.649496	8.530756
<b>Product Development</b>	10.32766	0.0417701	0.2668066	0.2606347	1.199869	0.1703995	0.2056848	1.153558	1,230,000,000	-123364.8	6.460341	10.81869
Performance Change between a Year before the year of the announcement and the year of the announcement (Year-1 to Year0)												
	ROE (%) Change	Liquidity Ratio Change	Cost to Income Change	Capital to T. Assets Change	Net Loans to T. Assets Ratio Change	Credit Risk Change	Loans to Deposits Change	Other Expenses to T. Assets Ratio Change	T. Assets Change	EVA Change	WACC Change	ROIC Change
<b>Diversification</b>	2.397286	-1.076235	-0.0820568	0.0098038	0.6600458	0.0070685	0.0262357	-0.730168	255,000,000	-10550.95	-0.0762177	-1.99011
<b>Market Development</b>	9.043761	-0.6011856	-0.0530351	0.0040902	-9.752834	-0.0124019	0.029316	-4.481989	341,000,000	14216.7	0.1525058	0.3447789
<b>Market Penetration</b>	2.510416	5.298176	-0.8313605	0.0052034	-0.1171085	0.0167375	0.0067215	11.14713	64,500,000	-655.4383	-0.0110144	0.0215029
<b>Product Development</b>	-7.21234	0.0061941	-0.0250528	0.017023	-0.2240554	0.0133617	0.0067525	-0.154679	116,000,000	31082.86	-0.0409542	4.337792
Performance Change between a Year the year of the announcement and the year Following the announcement (Year0 to Year+1)												
	ROE (%) Change	Liquidity Ratio Change	Cost to Income Change	Capital to T. Assets Change	Net Loans to T. Assets Ratio Change	Credit Risk Change	Loans to Deposits Change	Other Expenses to T. Assets Ratio Change	T. Assets Change	EVA Change	WACC Change	ROIC Change
<b>Diversification</b>	-0.6357554	-1.349828	-0.1460952	0.0083048	-0.4029334	0.003124	-0.0154871	-3.341869	146,000,000	6315.852	0.0710776	2.872633
<b>Market Development</b>	-3.679648	0.2554071	-0.2412874	0.0035381	0.4056682	-0.0996614	0.0513096	-11.20748	319,000,000	-18968.81	-0.0985612	0.2433643
<b>Market Penetration</b>	-6.03241	-1.556716	-2.541473	0.0085196	-0.2913136	-0.0435673	0.0072775	-17.49638	342,000,000	-21472.11	8.632385	-0.0133563
<b>Product Development</b>	0.4578724	-0.0021568	-0.0259619	0.0036783	0.0516306	-0.0001677	-0.0178374	-0.2518382	94,100,000	16087.53	-0.4043909	-2.685045

This table shows descriptive statistics in relation the merger announcement event and the orientation of that merger. It compares performance ratios and indices over during, before and after the merger announcement categorised over the deal orientation. ROE (%) is the Return on Equity - Total (%), Liquidity Ratio is (Current) Assets divided by Total Deposits(banks) or money held by the financial company on behalf of its customers. , Cost to Income Ratio is Operating Expenses divided by Revenue (Sales), Capital to Total Assets Ratio is the Total Capital divided by Total Assets, Net Loans to Total Assets is the Net Loans divided by Total Assets, Credit Risk is the Loan loss provision divided by Net interest revenues, Loans to Deposits Ratio is the Customer Loans divided by Customer Deposits, Other Expenses to Total Assets is the Other Expenses divided by Total Assets, EVA is the Economic Value Addition expressed in terms of Net Operating Profit After Tax (NOPAT), Total Invested Capital (TC), Cost of Capital (WACC) as  $EVA = NOPAT - WACC * (TC)$ . WACC is the Weighted Average Cost of Capital expressed as the sum product of the multiplication of cost of each capital component by its proportional weight and multiplied by 1 - Corporate tax rate. ROIC which is the Return on invested Capital expressed as Net Operating Profit After Tax (NOPAT) divided by Invested Capital which is calculated by subtracting cash and non-interest bearing current liabilities (NIBCL) – including tax liabilities and accounts payable, as long as these are not subject to interest or fees – from total assets. See Table 2-3 for sources of data collected for all Financial Institutions between 1990 (effectively 1995) and 2018.

Although the cost of capital appears with little variation among merger strategies, product development and market penetration deals can decrease capital cost faster than diversification and market development deals. Examining ROE and ROIC along with liquidity changes against the weighted average of the cost of capital (WACC) remits to theories that; diversification and market development deals expand geographically and can provide a higher return but at a cost that is high and long-standing in debts and balance sheets. Economic value addition exhibit positive mean only for diversifying deals. However, comparing the change in from before the merger to the year of the merger, EVA shows the highest deterioration in EVA for diversifying deals. Market development also exhibits negative EVA in year-1 to year0 change. A year on the merger provides different mapping; diversification provides the highest EVA followed market penetration. Market development mergers also improve EVA position a year on the merger, although it remains negative. Product development appears to enhance economic value in the short run but destroys economic value a year after the merger. Hence, diversification (new products and new markets) and market penetration (existing products in existing markets) provide the most sustainable economic value addition, lower cost of capital and higher cost-efficiency. This outcome justifies the time needed for mergers to realise potential returns and payback in scale and costs efficiencies.

Shareholders value creation of financial institutions mergers is tested by examining; **a)** cumulative abnormal returns CARs in short windows of  $[0, 0]$ ,  $[-1, +3]$  &  $[-1, +5]$  and **b)** Buy and Hold abnormal returns BHARs for longer windows of  $[-10, +60]$ ,  $[-10, +80]$ ,  $[-10, +100]$ ,  $[-10, +180]$  and  $[-10, +200]$ . This technique enables examining the effect of FIs merger announcement on acquiring financial institutions (and completion, 82.15% of deals are completed within 200 days of announcement). **Table 2-6** below shows CARs, along with their significance testing and probabilities, segregated over deal types of product and geographic orientations. While **table 2-7** shows BHARs and their significance over the same deal types.

Overall, FIs mergers destroy value for the bidding firms. CARs are all significant when tested over parametric and non-parametric significance tests, including the ones adjusting for normality of distribution. Market penetration mergers exhibit similar results.

Table 2-6 Short horizon event study results; cumulative abnormal returns along with parametric and non-parametric significance tests.

	Window (DAYS)	CAAR	t-Test Time Series	Prob.	t-Test cross sectional	prob	Patell Z	Prob.	Boehmer et al.	prob.	Corrado Rank	Prob.	Sign Test	Prob.
<b>Overall</b>	(0, 0)	-0.0029	-5.7172	0	-3.2264	0.0013	-9.747	0	-4.6867	0	-4.4647	0	-2.873	0.0041
<b>Acquirers</b>	(-1, +3)	-0.0047	-4.0741	0	-3.1035	0.0019	-5.6615	0	-3.8177	0.0001	-3.7174	0.0002	-2.2396	0.0251
<b>Shareholder value</b>	(-1, +5)	-0.0055	-4.0331	0.0001	-3.3082	0.0009	-5.0859	0	-3.6747	0.0002	-3.1432	0.0017	-2.398	0.0165
	(0, 0)	0.0018	1.124	0.261	1.0449	0.2961	1.896	0.058	1.4709	0.1413	0.9197	0.3577	0.522	0.6017
<b>Diversification</b>	(-1, +3)	-0.0002	-0.0597	0.9524	-0.072	0.9426	1.0826	0.279	1.1056	0.2689	0.5915	0.5542	1.3863	0.1657
	(-1, +5)	0.0016	0.3731	0.7091	0.5754	0.565	0.9224	0.3563	1.1307	0.2582	0.5765	0.5642	1.2134	0.225
	(0, 0)	0.0012	0.2946	0.7683	0.2879	0.7734	0.8627	0.3883	0.6072	0.5437	0.3783	0.7052	-0.028	0.9777
<b>Product development</b>	(-1, +3)	0.0126	1.3545	0.1756	0.9476	0.3434	1.9788	0.0478	1.0647	0.287	0.1971	0.8438	0.2679	0.7888
	(-1, +5)	0.0073	0.6658	0.5055	0.5886	0.5561	1.8423	0.0654	0.9404	0.347	0.1142	0.909	0.2679	0.7888
	(0, 0)	-0.0003	-0.3396	0.7342	-0.2515	0.8014	-2.5198	0.0117	-1.4391	0.1501	-0.2951	0.7679	-0.2477	0.8044
<b>Market development</b>	(-1, +3)	0	0.0022	0.9982	0.002	0.9984	-0.978	0.3281	-0.7694	0.4416	-0.6249	0.532	0.831	0.406
	(-1, +5)	0.0004	0.2054	0.8373	0.1899	0.8493	-0.365	0.7151	-0.3003	0.764	-0.0205	0.9836	0.3331	0.739
	(0, 0)	-0.0065	-8.7858	0	-3.9622	0.0001	-12.9581	0	-5.2941	0	-6.0652	0	-4.1856	0
<b>Market penetration</b>	(-1, +3)	-0.0108	-6.5484	0	-4.33	0	-8.3569	0	-4.9846	0	-4.65	0	-4.7245	0
	(-1, +5)	-0.0128	-6.6029	0	-4.7118	0	-7.9793	0	-5.1932	0	-4.3591	0	-4.4165	0

This table shows in the immediate market response to merger announcements, conglomeration (total diversification) destroys shareholders value. This result is similar to the complete opposite consolidation strategy of market penetration, although the latter is at 10 folds magnitude. Market and product development merger strategies appear to create significant value for shareholders in the immediate merger window.

Diversification strategies do not appear to have a significant influence on acquiring FIs shareholders value in the short horizon of the merger. However, results for market and product development appear not significant overall, they do exhibit positive CARs, and significant in the windows of (0, 0) and (-1, +3) respectively. This reaction is a realisation of the anticipated synergy from different types of deals and their values. Target-bidder relative sizes (Chen and Tan, 2011), market conditions regulations and the currency used (Ekkayokkaya *et al.*, 2009) are also factors of how shareholders value would exhibit in response to FI merger. Kiyamaz (2013) poses the targeted country's risk, economic, political, and financial risk ratings as other vital reasons affecting bidding FIs ARs.

**Table 2-7** shows the long horizon event study results and the Buy and Hold abnormal returns, also segregated over the various strategies that describe the FIs mergers. Results show overall positive and significant value creation in 50 and 80 trading days, following the merger announcement. Market development mergers exhibit positive and significant BHARs 50 days on merger announcement. Lowering the confidence threshold from 95% to 90% increases the number of long-horizon windows and categories that show a significant reaction in BHAR to the merger announcement. Overall, the significant positive response reaches 110 days after the merger announcement. Mostly, because markets would settle after the announcement and foresee increased potential to generate value and realise profits afterwards (Lepetit *et al.*, 2004; Williams and Liao, 2008). Market penetration, contrary to short-horizon merger analysis, do not exhibit significant (nor positive nor negative) BHARs in any of the windows. Market development and diversifying mergers follow the same suit. However, product development, which describes FIs merging with other FIs in a different industry in the same jurisdiction, exhibit positive abnormal returns in 50, 110 and 140 days after the event (and 230 days at 90% confidence).

*Table 2-7 Long horizon event study results and the buy and hold abnormal returns CBHARs segregated over merger strategies.*

	Window (DAYS)	BHAR	Pos:Neg	Prob.	Skewness Adjusted	p- Value
<b>Overall</b>	CBHAR [-50, +50]	<b>0.0135</b>	704 : 734	<b>0.0122</b>	2.679	<b>0.0074</b>
	CBHAR [-50, +80]	<b>0.0126</b>	692 : 746	<b>0.0388</b>	2.172	<b>0.0299</b>
	CBHAR [-50, +110]	<b>0.0112</b>	692 : 746	<b>0.0831</b>	1.7885	<b>0.0737</b>
	CBHAR [-50, +140]	0.0078	681 : 757	0.2548	1.1652	0.2439
	CBHAR [-50, +200]	0.0104	684 : 754	0.2126	1.2858	0.1985
	CBHAR [-50, +230]	0.0115	687 : 751	0.2052	1.3282	0.1841
<b>Market Penetration</b>	CBHAR [-50, +50]	0.0093	310 : 366	0.2415	1.2032	0.2289
	CBHAR [-50, +80]	0.0121	308 : 368	0.2019	1.3325	0.1827
	CBHAR [-50, +110]	0.0108	306 : 370	0.3021	1.0727	0.2834
	CBHAR [-50, +140]	0.012	315 : 361	0.2881	1.1033	0.2699
	CBHAR [-50, +200]	0.0163	316 : 360	0.2415	1.231	0.2183
	CBHAR [-50, +230]	0.0217	329 : 347	0.1668	1.5008	0.1334
<b>Market Development</b>	CBHAR [-50, +50]	<b>0.0172</b>	300 : 282	<b>0.0473</b>	2.2812	<b>0.0225</b>
	CBHAR [-50, +80]	0.0137	287 : 295	0.1436	1.5858	0.1128
	CBHAR [-50, +110]	0.0094	283 : 299	0.3085	1.048	0.2946
	CBHAR [-50, +140]	0.0017	281 : 301	0.8604	0.1834	0.8545
	CBHAR [-50, +200]	0.0065	290 : 292	0.5695	0.5839	0.5593
	CBHAR [-50, +230]	0.0032	281 : 301	0.7829	0.2842	0.7762
<b>Product Development</b>	CBHAR [-50, +50]	<b>0.0777</b>	27:19:00	<b>0.0279</b>	2.6687	<b>0.0076</b>
	CBHAR [-50, +80]	0.0486	29:17:00	0.1232	1.6436	0.1003
	CBHAR [-50, +110]	<b>0.0639</b>	31:15:00	<b>0.0424</b>	2.2277	<b>0.0259</b>
	CBHAR [-50, +140]	<b>0.0651</b>	25:21:00	<b>0.0458</b>	2.2504	<b>0.0244</b>
	CBHAR [-50, +200]	0.0374	22:24	0.2971	1.1087	0.2675
	CBHAR [-50, +230]	<b>0.0608</b>	23:23	0.1064	1.7379	<b>0.0822</b>
<b>Diversification</b>	CBHAR [-50, +50]	-0.0037	67 : 67	0.7681	-0.2843	0.7762
	CBHAR [-50, +80]	-0.0019	68 : 66	0.8991	-0.1129	0.9101
	CBHAR [-50, +110]	0.0028	72 : 62	0.8692	0.1761	0.8602
	CBHAR [-50, +140]	-0.0065	60 : 74	0.7092	-0.3664	0.7141
	CBHAR [-50, +200]	-0.0118	56 : 78	0.5813	-0.5268	0.5983
	CBHAR [-50, +230]	-0.0209	54 : 80	0.3409	-0.9241	0.3555

*This table shows the long horizon event study results and the buy and hold abnormal returns CBHARs segregated over the various strategies that describe the FIs mergers. Overall positive and significant value creation in 50, 80 and 110 trading days following the merger announcement. Market development mergers exhibit positive and significant BHARs 50 days on merger announcement. Red and green highlighted figures are t-tests probability at confidence levels of 95% and 90% respectively.*

Therefore, bidding FIs destroy shareholders value in the immediate effect of mergers announcement with clear evidence from focused FIs mergers. However, in the longer run, product development mergers are more consistently value-creating than other consolidation strategies. Diversification, for instance, is also referred to as conglomeration, because going cross border and for a different industry.

Although it diversifies risk and sources of income and could be seeking a too-big-to-fail status (Elsas *et al.*, 2010), it involves much higher risks (environmental, cultural and legal) (Berger *et al.*, 2013). This outcome justifies the positive perception in the short horizon event study but detrimental in the long run. Markets have exclusively well-perceived Product development. Positive and significant abnormal returns in both short and long horizons. A resolution that reflects the high potential to enhance productivity and benefit from economies of scale (Ayadi *et al.*, 2013) and strategic similarities (Altunbas and Ibanez, 2008). In addition to the economies of scope and efficiencies enhancement when combined with positive BHARs of market development and market penetration. This result contradicts with the literature that elaborates on the lack of technical efficiencies (Laeven and Levine, 2007), and the opaqueness and brand identity loss and agency problems (Elyasiani and Wang, 2012) due to such mergers.

When segregating the data set over deal criteria, several exciting results surface. Megadeals, with a value of US\$10 Billion, appear to preserve more value for bidding FIs shareholders than those involved in a non-mega deal. **Table 2-8** below shows that, although they both exhibit negative CARs in the prompt windows of (0, 0), (-1, +1, +3 &+5) days, mega deals bidders exhibit 10 folds more value creation. It is justified as the volume effect, i.e. the number of the non-mega deals is 35 times more than the mega-deals with a market value of deals of 66 times more than the mega-deals. The magnitude of CAAR in non-mega deals seems of a different order because it is the accumulated over 81 trading days (-40,0,+40) while others are over 1, 3, or a maximum of six days. The magnitudes of

mega-deals are of a similar order, but they are not significant, and the number of megadeals is much less the number of non-megadeal. The same applies when differentiating over currency and payment method in table 2-9.

**Table 2-8 CARs and BHARs variations over merger announcement windows and if the merger is Mega or not.**

Window	Mega Deals			Non-Mega Deals		
	CAAR	t-Test Time Series	Prob.	CAAR	t-Test Time Series	Prob.
(-40, +40)	-0.011	-0.4651	0.6418	<b>2.1181</b>	450.0592	<b>0.000</b>
(0, 0)	<b>-0.0207</b>	-7.8637	<b>0.000</b>	<b>-0.0024</b>	-4.6161	<b>0.000</b>
(-1, +1)	<b>-0.0202</b>	-4.4185	<b>0.000</b>	<b>-0.0031</b>	-3.3683	<b>0.0008</b>
(-1, +3)	<b>-0.0223</b>	-3.7801	<b>0.0002</b>	<b>-0.0042</b>	-3.5592	<b>0.0004</b>
(-1, +5)	<b>-0.0229</b>	-3.281	<b>0.001</b>	<b>-0.005</b>	-3.5916	<b>0.0003</b>
	BHAR	Skewness Adjusted	p- Value	BHAR	Skewness Adjusted	p- Value
(-50, +230)	0.0058	0.1636	0.8701	0.0117	1.3175	0.1877
(-50, +200)	0.0004	0.0125	0.99	0.0107	1.2943	0.1956
(-50, +170)	0.0081	0.2407	0.8098	0.0097	1.282	0.1998
(-50, +140)	0.002	0.0591	0.9529	0.008	1.1648	0.2441
(-50, +110)	-0.0024	-0.1036	0.9175	<b>0.0116</b>	1.8123	<b>0.0699</b>
	<b>41 deals; \$US 800,103.55</b>			<b>1445 deals;</b>		
	<b>Average Value per deal \$US19,514.72 million</b>			<b>\$USD 1,284,657.52 Million</b>		

*This table shows the Short and Long Horizon event studies results showing CARs and BHARs and their relevant t-statistics, segregating Mega mergers deals (combined total assets value is greater than or equal \$US 10 Billion) and non- Mega deals. Red shadowed probabilities refer to the significance of abnormal returns at 95% confidence, and green ones are at 90% confidence. Number and value of deals under each category are appended at the end of the relevant column.*

However insignificant, BHARs are all positive for bidding FIs. Nevertheless, mega deals can generate ten more folds abnormal returns in the long run than non-mega deals. Reflecting shareholders appreciation of the general capability of large deals to capitalise upon the existing size and reputation and geographical coverage of bidders and targets to enhance efficiency and drive profit and value. As a result of larger diversification benefits, stronger capital positions in addition to projected cuts to operating costs and costs of capital (Carow and Kane, 2002; Houston *et al.*, 2001; Kane, 2000).

Financial institutions mergers that are paid by \$US currency create significantly more value for bidders, in the short horizon than the ones paid for in Euro and British Pound. Deals paid by other

currencies (local currencies) tend to create value upon merger announcement when the rest of deals destroy value (windows (0, 0) and (-1, +1)). **Table 2-9** also shows that payment in bidders local currencies have a long-lasting value effect with BHARs being positive and significant until 230 days after the deal announcement.

*Table 2-9 CARs and BHARs variations over merger announcement windows and deal currency.*

Window	USD			Other Currencies (Local)			Euro			GBP		
	CAAR	<i>t-Test</i> Time Series	Prob.	CAAR	<i>t-Test</i> Time Series	Prob.	CAAR	<i>t-Test</i> Time Series	Prob.	CAAR	<i>t-Test</i> Time Series	Prob.
(-40, +40)	<b>4.6107</b>	751.1014	<b>0.0001</b>	-0.003	-0.3115	0.7554	-0.005	-0.4455	0.656	<b>-0.031</b>	-1.9555	<b>0.0505</b>
(0, 0)	<b>-0.0084</b>	-12.2967	<b>0.001</b>	<b>0.0037</b>	3.4231	<b>0.0006</b>	-0.0012	-0.9785	0.3278	-0.0008	-0.4379	0.6615
(-1, +1)	<b>-0.0108</b>	-9.1004	<b>0.0021</b>	<b>0.0048</b>	2.5357	<b>0.0112</b>	-0.0006	-0.2987	0.7652	-0.0002	-0.0776	0.9381
(-1, +3)	<b>-0.0111</b>	-7.2482	<b>0.0001</b>	0.0027	1.0991	0.2717	-0.0034	-1.2109	0.226	0.0011	0.2704	0.7869
(-1, +5)	<b>-0.011</b>	-6.1117	<b>0.0002</b>	0.0015	0.5213	0.6022	<b>-0.0064</b>	-1.9543	<b>0.0507</b>	0.0021	0.4485	0.6538
	BHAR	Skewness Adjusted	p-Value	BHAR	Skewness Adjusted	p-Value	BHAR	Skewness Adjusted	p-Value	BHAR	Skewness Adjusted	p-Value
(-50, +230)	-0.0086	-0.7088	0.4784	<b>0.0532</b>	3.0401	<b>0.0024</b>	-0.007	-0.3414	0.7328	0.0116	0.4881	0.6255
(-50, +200)	-0.0117	-1.0265	0.3046	<b>0.049</b>	3.0047	<b>0.0027</b>	-0.0024	-0.1113	0.9114	0.0208	0.846	0.3975
(-50, +170)	-0.0115	-1.0939	0.274	<b>0.0458</b>	3.0305	<b>0.0024</b>	0.0042	0.2615	0.7937	0.0069	0.321	0.7482
(-50, +140)	<b>-0.017</b>	-1.9165	<b>0.0553</b>	<b>0.0446</b>	3.2668	<b>0.0011</b>	0.0087	0.5393	0.5897	0.0088	0.4288	0.6681
(-50, +110)	<b>-0.0151</b>	-1.7752	<b>0.0759</b>	<b>0.0477</b>	3.757	<b>0.0002</b>	0.015	1.0036	0.3156	0.0155	0.8066	0.4199
	<b>651 deals; \$US 995,498.22 Million</b>			<b>453 deals; \$US 498,484.17 Million</b>			<b>264 deals; \$US 403,953.93 Million</b>			<b>117 deals; \$US 186,823.75 Million</b>		

*This table shows Short and Long Horizon event studies results showing CARs and BHARs and their relevant t-statistics, segregating deals where payments were made in US dollars, Euro, British Pound (GBP) and other currencies that are bidders' local currencies other than \$US, Euro, and GBP. Red shadowed probabilities refer to the significance of abnormal returns at 95% confidence, and green ones are at 90% confidence. Number and value of deals under each category are appended at the end of the relevant column.*

Payment type (method) also shows a significant association with shareholders value effect of FIs mergers. **Table 2-10** shows little to non-significant adjustment in shareholders' value when the deal is paid for by "Stock and Debt", "Cash, Stock and Debt" and when the payment type is "Undisclosed". However, "Cash" paid deals show significant positive abnormal returns in the short and long horizons; from announcement windows to +200 and +230 days windows. This outcome evidence a clear preference of shareholders to this type of deals, because cash payments for such large transactions reflect the bidder's adequacy and liquidity, which enables FIs to face any future challenges, resulting from or not resulting from the decision of the merger. Furthermore, the literature suggests that "cash" in itself as a medium of payment for merger deals is interpreted as good news, opposite to when it is "stock" (Franks *et al.*, 1991; Travlos, 1987).

When the merger is paid by "Stock" or "Cash or Stock" shareholders value resembles the mainstream reaction known from bidders' shareholders in FIs mergers, negative small magnitude CAR. However, deals with these types of payments sustain negative shareholders value to the long horizon too with negative insignificant BHARs.

The 2008-2011 financial crisis seems to have influenced shareholders values of bidding FIs in M&As. Deals that took place before the crisis (i.e. before August 2007) confirm the literature of negative ARs in short horizons and positive ARs in long horizons. The crisis (between September 2007 and August 2001) and appears to have a long-lasting negative effect on shareholders' value. BHARs during the financial crisis were consistently negative and 4 to 7 times more in magnitude compared to the same windows before the crisis. **Table 2-11** also shows shareholders value has improved in response to FIs mergers from the beginning of 2012. ARs in the short horizons are either positive or negative, but 3 to 5 folds less compared to ARs during the crisis. Moreover, abnormal returns in the long horizon turned to become all positive with a significant 2 to 4 folds higher than before the crisis.

**Table 2-10 CARs and BHARs variations over merger announcement windows and deal payment methods.**

Window	Stock			Cash			Cash or Stock			Undisclosed		
	CAAR	t-Test Time Series	Prob.	CAAR	t-Test Time Series	Prob.	CAAR	t-Test Time Series	Prob.	CAAR	t-Test Time Series	Prob.
(-40, +40)	-0.027	-2.6113	0.009	3.9479	620.1382	0	-0.0256	-1.7462	0.0808	-0.0239	-1.5349	0.1248
(0, 0)	-0.0102	-8.8729	0.000	0.002	2.7759	0.0055	-0.0177	-10.864	0.000	0.002	1.1387	0.2548
(-1, +1)	-0.0112	-5.6065	0.000	0.002	1.6671	0.0955	-0.024	-8.5141	0.000	0.0032	1.0627	0.2879
(-1, +3)	-0.0146	-5.6767	0.000	0.0016	1.0403	0.2982	-0.0232	-6.3752	0.000	0.0021	0.5467	0.5846
(-1, +5)	-0.0176	-5.8016	0.000	0.0019	1.0169	0.3092	-0.0229	-5.3286	0.000	0.0021	0.4635	0.643
	BHAR	Skewness Adjusted	p- Value	BHAR	Skewness Adjusted	p- Value	BHAR	Skewness Adjusted	p- Value	BHAR	Skewness Adjusted	p- Value
(-50, +230)	-0.0016	-0.0749	0.9403	<b>0.0295</b>	2.5453	0.0109	-0.0009	-0.0181	0.9856	0.0026	0.1012	0.9194
(-50, +200)	-0.0032	-0.1623	0.8711	<b>0.0297</b>	2.7903	0.0053	-0.0098	-0.3072	0.7587	-0.0076	-0.3398	0.734
(-50, +170)	-0.0066	-0.368	0.7129	<b>0.0313</b>	3.2469	0.0012	-0.0019	-0.0498	0.9603	-0.0214	-0.9827	0.3258
(-50, +140)	-0.0058	-0.3598	0.719	<b>0.028</b>	3.2792	0.001	-0.0167	-0.6517	0.5146	-0.0147	-0.7003	0.4837
(-50, +110)	-0.0088	-0.6091	0.5425	<b>0.034</b>	4.2436	0.000	-0.004	-0.1491	0.8815	-0.015	-0.7439	0.457
<b>367 deals; \$US 953,552.4 Million</b>			<b>780 deals; \$US 686,141.7</b>			<b>91 deals; \$US 80,434.94 Million</b>			<b>103 deals; \$US 55,704.54</b>			
Window	Cash and Debt			Stock and Debt			Cash, Stock and Debt			Cash and Stock		
	CAAR	t-Test Time Series	Prob.	CAAR	t-Test Time Series	Prob.	CAAR	t-Test Time Series	Prob.	CAAR	t-Test Time Series	Prob.
(-40, +40)	-0.0051	-0.0933	0.9256	0.0614	0.7317	0.4644	-0.1125	-1.6008	0.1094	<b>-0.0285</b>	-2.0938	0.0363
(0, 0)	<b>0.0148</b>	2.4105	0.0159	-0.0128	-1.3685	0.1712	-0.0006	-0.0721	0.9425	<b>-0.0075</b>	-4.99	0
(-1, +1)	<b>0.028</b>	2.6379	0.0083	-0.0077	-0.4758	0.6343	-0.0112	-0.83	0.4065	<b>-0.0101</b>	-3.8783	0.0001
(-1, +3)	<b>0.0285</b>	2.0839	0.0372	0.0211	1.0102	0.3124	-0.0075	-0.4319	0.6658	<b>-0.0118</b>	-3.5038	0.0005
(-1, +5)	0.0129	0.7985	0.4246	0.0206	0.8335	0.4045	-0.0193	-0.9348	0.3499	<b>-0.0115</b>	-2.8676	0.0041
	BHAR	Skewness Adjusted	p- Value	BHAR	Skewness Adjusted	p- Value	BHAR	Skewness Adjusted	p- Value	BHAR	Skewness Adjusted	p- Value
(-50, +230)	0.0281	0.3056	0.7599	-0.2671	-1.4291	0.153	-0.1835	-1.0033	0.3157	-0.0329	-1.3183	0.1874
(-50, +200)	0.0513	0.4947	0.6208	-0.1797	-0.8887	0.3741	-0.1869	-1.3373	0.1811	-0.0329	-1.387	0.1654
(-50, +170)	0.0432	0.526	0.5989	-0.1757	-0.8587	0.3905	-0.1242	-0.9458	0.3443	<b>-0.0389</b>	-1.8643	0.0623
(-50, +140)	-0.0019	0.0472	0.9624	-0.1844	-1.0757	0.2821	-0.1719	-1.351	0.1767	-0.0285	-1.363	0.1729
(-50, +110)	-0.0195	-0.1529	0.8785	-0.1263	-1.2685	0.2046	-0.1551	-1.2592	0.2079	-0.0257	-1.2436	0.2137
<b>16 deals; \$US 17,991.21 Million</b>			<b>3 deals; \$US 1,814.94 Million</b>			<b>7 deals; \$US 11,712.4 Million</b>			<b>118 deals; \$US 277,408.94 Million</b>			

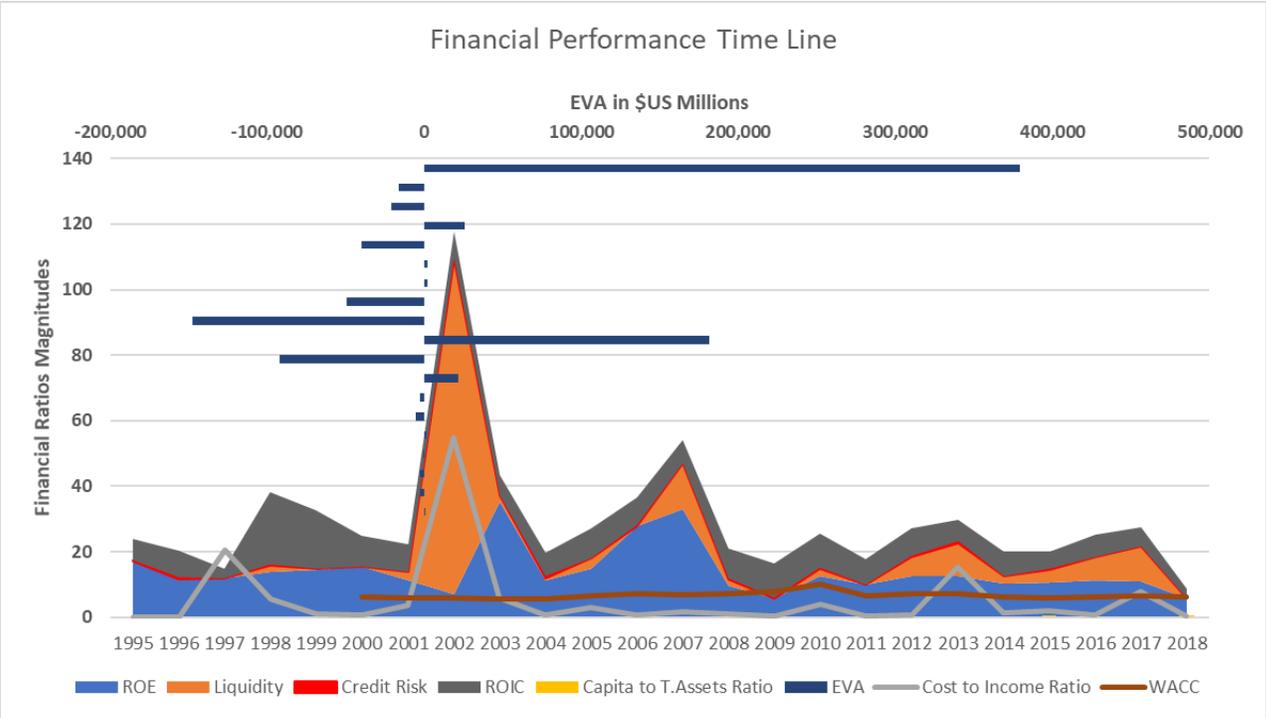
This Table shows Short and Long Horizon event studies results showing CARs and BHARs and their relevant t-statistics, segregating deals where payments was made using "Stock", "Cash", "Cash or Stock", "Cash and Debt", "Stock and Debt", "Cash, Stock and Debt", "Cash and Stock", or "Undisclosed". Red shadowed probabilities refer to the significance of abnormal returns at 95% confidence, and green ones are at 90% confidence. Number and value of deals under each category are appended at the end of the relevant column.

**Table 2-11 CARs and BHARs variations over merger announcement windows during, before and after the 2008-2011 crisis.**

Window	Before Crisis			During Crisis			After Crisis		
	CAAR	t-Test Time Series	Prob.	CAAR	t-Test Time Series	Prob.	CAAR	t-Test Time Series	Prob.
(-40, +40)	-0.0206	-3.5397	0.0004	-0.0213	-1.5542	0.1201	6.8809	<b>817.1345</b>	0
(0, 0)	-0.0046	-7.1463	0	-0.0004	-0.2552	0.7985	-0.0015	-1.5763	0.115
(-1, +1)	-0.0067	-5.996	0	-0.0006	-0.2164	0.8287	0.0003	0.1711	0.8642
(-1, +3)	-0.0082	-5.6931	0	-0.0023	-0.6671	0.5047	0.0001	0.0532	0.9576
(-1, +5)	-0.0084	-4.9346	0	-0.0043	-1.0635	0.2875	-0.001	-0.4153	0.6779
	BHAR	Skewness Adjusted	p- Value	BHAR	Skewness Adjusted	p- Value	BHAR	Skewness Adjusted	p- Value
(-50, +230)	0.0168	1.4138	0.1574	<b>-0.0617</b>	-2.8511	0.0044	<b>0.0445</b>	3.1158	0.0018
(-50, +200)	<b>0.0205</b>	1.8158	0.0694	<b>-0.0721</b>	-3.3432	0.0008	<b>0.0403</b>	3.103	0.0019
(-50, +170)	<b>0.0183</b>	1.7727	0.0763	<b>-0.0643</b>	-2.8911	0.0038	<b>0.037</b>	3.1206	0.0018
(-50, +140)	<b>0.0159</b>	1.7171	0.086	<b>-0.0613</b>	-3.1782	0.0015	<b>0.0334</b>	3.0807	0.0021
(-50, +110)	<b>0.0174</b>	2.0816	0.0374	<b>-0.0557</b>	-3.1525	0.0016	<b>0.0388</b>	3.7505	0.0002
<b>786 deals; \$US 1,345,549.04 Million</b>			<b>258 deals; \$US 340,587.5 Million</b>			<b>441 deals; \$ USD 398624.53 Million</b>			

This table shows Short and Long Horizon event studies results showing CARs and BHARs and their relevant t-statistics, segregating FI's merger deals announcement (and completion) years over the three periods of Before, During and After the 2007-2011 financial crisis. Coefficients marked with \*, \*\* and \*\*\* refer to the significance of abnormal returns at 90%, 95% and 99% confidence levels respectively. Number and value of deals under each category are appended at the end of the relevant column.

Chart 2.A shows the timeline of financial performance variables means; during before, during and after the financial crisis. Towards the end of 2007 and beginning of 2008, there was a sharp decline in bidders FIs liquidity, ROE, and economic value. Credit risk has also culminated during this period but dipped in 2009. This exhibition mainly reflects the lessened credit activities expected from banks due to the crisis.



**Figure 2-1** Historic financial performance of FIs involved in a merger between 1995 and 2018.

Notably, returns on invested capitals during the 2008-2011 crisis were not much affected, and in harmony with credit risk and liquidity increase in 2007. This outcome could represent regulators’ bailout policies enforced to keep the financial sector afloat through capital injections in defaulted banks (Kaufman, 2014; Dunn *et al.*, 2015). Distinctly, 2002 witnessed heightened liquidity, credit risk and return on invested capital but lower returns on equity. A result that justifies the adaptation policies FIs implemented in the wake of the dotcom bubble; through savings on operational costs and

utilising the available funds (liquidity) in issuing loans (Petersen and Wiegmann, 2014; Andriosopoulos and Yang, 2015).

### 2.4.2 FIs mergers: a multivariate analysis

Following sections shed more light on FIs industry groups and how mergers affect value creation in short horizons, long horizons and the possible determinants of consolidation strategies. Specifically, a performance examination of; profitability, income and operational efficiencies, capital structure and cost, in addition to the deal criteria of value, orientation, markets, payment types, and bidders size. Following model (14) below, accounting factors in the years before the merger ( $t-1$ ) in association with Abnormal returns (short and long) ( $t$ ) to test for influences on the decision to merge and targets industry are examined. In retrospect, the financial performance in the year of the merger and the year following the merger ( $t$  and  $t+1$ ) in association with abnormal returns around the merger ( $t$ ) are analysed. Later, an exploration of the effect of the 2008-2011 financial crisis on FIs mergers and bidders returns and performance takes place.

$$\begin{aligned}
 \text{Performance}_{i, \{t-1, t+1\}} &= \alpha + \gamma \text{Returns}_{i, \{CAR, BHAR\}} + \delta \text{Deal Criteria}_{i, \left\{ \begin{array}{l} \text{Strategic Orientation} \\ \text{Geographic Orientation} \\ \text{Product Orientation} \\ \text{Deal Value} \\ \text{Bidder Size} \end{array} \right.} \quad (2.14)
 \end{aligned}$$

Performance variables are analysed separately for the different groups of bidders. Specifically, Loans to T. Assets, Loans to Deposits and Credit Risk are dropped when examining Insurance, Investment or Real Estate bidders because they are a bank (lending) specific variables.

### ***2.4.2.1 Pre-merger performance and shareholder value***

Results show a significant association between shareholders value and financial accounting performance variables. From the strategic point of view, financial performance in the year preceding merger announcement associates adversely with creating shareholders value in diversifying deals in the short horizon. Although the opposite is right in the long horizons, it is only the return on equity that is proven to contribute to the abnormal returns 230 days from merger positively. **Table 2-12** also shows that FIs pursuing a market development strategy can only create shareholders value, in the short and long horizons, when bidders can manage to higher levels of liquidity and low levels of costs and other expenses. The reason is that there exists a negative association of CAR with ROE and expenses to assets ratio and BHAR with the cost to income and expenses to assets ratios. However, CAR and BHAR associates positively with liquidity in activity focusing that are geographically diversifying mergers. Multivariate regression also provides evidence on market penetration strategies in the financial sector. It shows that bidding FIs with a higher cost of capital and lower return on invested capital, in the year preceding merger, can create shareholders value in the short horizon, but not in the long one. It most probably reflects the need for those bidders to engage in a merger to consolidate resources and enhance returns and become more able to manage capital and assets.

Furthermore, FIs, and specifically banks, can sustain a shareholder's value creation until almost a year after the merger when they maintain low credit risk levels and issue fewer loans than deposits in the year before the merger, similarly for net loans to assets ratio. Results explain how investors can sense and perceive risk from FIs historical activity.

Table 2-12 Robust regression; Abnormal returns (CARs and BHARs), mergers strategy and pre-merger performance.

Robust Regression	Diversification	Obs = 37	Market Development	Obs = 157	Market Penetration	Obs = 226	Product Development	Obs = 13
<i>Previous Year Performance</i>	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
ROE (%)	-0.0003255***	0.4209298**	-0.0000131	0.0065931	0.0001074	1.015598*	0.0161728***	6.587949
Liquidity Ratio	-0.0278303**	8.337784	0.0002349	0.454348	-0.0000887	-0.0252493	-0.4864793**	-898.6315
Cost to Income	-0.0086635**	1.855357	0.0000194	-0.4075652	-0.0001265*	0.0026609	-0.1097141**	129.5067
Capital to Assets	0.0434019	90.23056	0.0341887	25.33049	-0.0297565	-31.0724	0.3788745**	639.3965*
Net Loans to Assets	-0.0008068	99.98779	-0.0405374	-19.077	0.0131323	79.06676***	1.076144***	61.72145
Credit Risk	0.0352719	-47.10763	0.0139792	22.40882	0.0062033	-36.00029**	-0.1220865**	-295.1357
Loans to Deposits Ratio	-0.0593076	-116.4827	0.0029544	0.9665342	-0.00727	-23.97165	0.710125***	144.7414
Other Expenses to Assets	0.014888**	-4.374972	-0.00000912	-0.0123773	0.0001409*	-0.0114116	0.2273839**	507.6443
EVA (Scaled over Total Assets)	-82.29079	2929777*	-305.4824	-606647.3	56.02187	2823.182	14398.42***	7932149
WACC	-0.002145	6.17088	0.0007457	2.851475	0.0039269***	1.783689	-0.0789164***	-35.52711
ROIC	0.002693	-3.638494	0.0004431	-1.086788	-0.0033973***	-2.292498*	0.0371699*	35.95919
_cons	-0.0050636	-60.35876	-0.0121255	-1.743463	-0.0157467	-42.50655	-0.6011583	-99.13038

This table shows the robust regression analysis results of CARs and BHARs over the financial performance variables of the year before merger announcement, segregating FIs merger by deal types of diversification, market development, market penetration and product development. Where EVA is the Economic Value Addition expressed in terms of Net Operating Profit After Tax (NOPAT), Total Invested Capital (TC), Cost of Capital (WACC) as  $EVA = NOPAT - WACC * (TC)$ . WACC is the Weighted Average Cost of Capital expressed as the sum product of the multiplication of cost of each capital component by its proportional weight and multiplied by  $1 - \text{Corporate tax rate}$ . ROIC which is the Return on invested Capital expressed as Net Operating Profit After Tax (NOPAT) divided by Invested Capital which is calculated by subtracting cash and non-interest bearing current liabilities (NIBCL) – including tax liabilities and accounts payable, as long as these are not subject to interest or fees – from total assets. See Table 2-3 for sources of data collected for all Financial Institutions between 1990 (effectively 1995) and 2018. Coefficients marked with \*, \*\* and \*\*\* refer to the significance of abnormal returns at 90%, 95% and 99% confidence levels respectively.

A closer analysis of these market-product development strategies reveals several interesting facts about bidding and target financial institutions and deals orientations. **Table 2-13** shows that, under total diversification, banks conglomerating into real estate industry is most dominant, with a vast influence on shareholders' value. In the short horizon, high return on equity, liquidity and credit risk but lower other expenses to assets ratios drive positive CAR. This is a relatively expected outcome; slightly high credit risk reflects activities that bring in returns and profitability and consequently, liquidity. However, in the long horizon, only capital structure and efficiency measures that enable banks to create shareholders value, and not profitability or liquidity, of the previous year.

BHARs are negatively associated with ROE, liquidity, cost to income and cost of capital, but positively associated with capital to assets, net loans to assets and other expenses to assets ratios and return on invested capital. An outcome that contradicts with the recent literature on the adverse effect of increasing capital ratios (Wagner, 2010; Weiss *et al.*, 2014). Another necessary notation in this type of mergers is the risk of being a mostly negative impact on long-run shareholders value. This notation is apparent through the negative and significant association /dependency between BHAR and both credit risk and the loans to deposits ratio.

Table 2-13 Robust regression; Abnormal returns (CARs and BHARs), mergers geographic orientation and pre-merger performance.

Robust Regression	Cross border; Bank-Real Estate; Obs = 16		Cross border, Cross State; Bank-Bank; Obs = 41		Cross border, Cross State; Real Estate-Real Estate; Obs = 61		Local, Interstate; Banks-Banks; Obs = 153		Local, Interstate; Insurance-Insurance; Obs = 36		Local, Interstate; Real Estate-Real Estate; Obs = 37	
	CAR (-1, +3) Coef.	CBHAR (-50, +230) Coef.	CAR (-1, +3) Coef.	CBHAR (-50, +230) Coef.	CAR (-1, +3) Coef.	CBHAR (-50, +230) Coef.	CAR (-1, +3) Coef.	CBHAR (-50, +230) Coef.	CAR (-1, +3) Coef.	CBHAR (-50, +230) Coef.	CAR (-1, +3) Coef.	CBHAR (-50, +230) Coef.
<i>Previous Year Performance</i>												
ROE (%)	0.0079749**	-9.62424***	0.0010803	2.158569	0.0031423***	0.5272972	-0.0002792	1.811499*	-0.000096	-2.443096	0.0018826	0.3668814
Liquidity Ratio	3.342592*	-5246.052***	0.0159315	-14.86788	-0.0006769*	-0.6049543**	0.0001698	0.8573954**	-0.0005114***	-0.2110574	-0.0020172	7.682731
Cost to Income	1.912638	-4100.593***	-0.0141474	12.59981	-0.000538*	-1.419708***	0.0002394*	0.4135248**	0.0018095*	1.267802	-0.0001216	-2.634588
Capital to Assets	0.0590186	1369.892***	0.0810874	-16.53024	-0.0207018	-15.19479	-0.0420531	-93.10637	-0.0213208	142.2274	0.0646738	28.32489
Net Loans to Assets	0.0064608	246.6167***	-0.0579447	-17.14922	-0.0406147	45.53793	0.0084049	90.69927**	0.1953555**	-28.46037	0.0180326	86.95109
Credit Risk	0.191527**	-89.2252**	0.0119096	116.754	0.0627979	-25.50063	-0.0151884	-40.70283**	0.0806875	28.83074	0.0544366	-16.52597
Loans to Deposits Ratio	0.4778001	-964.2509***	-0.0038113	4.550943	0.0467782	10.58159	-0.0028418	-35.78006***	0.0279161	25.14502	-0.1205176**	66.40969
Other Expenses to Assets	-2.3586*	4407.259***	-0.0000105**	-0.0152029**	0.0013697**	2.042254***	-0.0002805	-0.6259189**	0.0003463***	-0.0034425	0.0011745	-2.016927
EVA (Scaled over Total Assets)	1245.2	-18452.2***	2045.23**	24362.8*	1263**	-3664253***	624	8235642	-3240.3***	5946325	-2985.2	-3526496
WACC	0.0534052	-45.58633***	0.0013048	6.805111	0.0002966	-1.543076	0.0056562**	1.92943	-0.0019161	-0.3619568	-0.0027938	-2.032816
ROIC	-0.041032	56.91335***	-0.0002822	-4.337059*	-0.0029465	-2.657846	-0.0039375**	-3.468777*	-0.0002231	3.311383	-0.0015635	-2.132783
cons	-0.3230745**	-182.3503**	-0.019587	-33.71042	-0.0358549	-4.858974	-0.0100878	-38.0988	-0.132859*	-1.862523	-0.0243152	-57.26809

This table shows robust regression analysis results of CARs and BHARs over the financial performance variables of the year before merger announcement, segregating FIs merger by deal types of Geographic Orientation (Local, Cross border and Interstate or cross state for US) and Product Orientation depending on Acquirers and Targets Industries. EVA is the Economic Value Addition expressed in terms of Net Operating Profit After Tax (NOPAT), Total Invested Capital (TC), Cost of Capital (WACC) as  $EVA = NOPAT - WACC * (TC)$ . WACC is the Weighted Average Cost of Capital expressed as the sum product of the multiplication of cost of each capital component by its proportional weight and multiplied by  $1 - \text{Corporate tax rate}$ . ROIC which is the Return on invested Capital expressed as Net Operating Profit After Tax (NOPAT) divided by Invested Capital which is calculated by subtracting cash and non-interest bearing current liabilities (NIBCL) – including tax liabilities and accounts payable, as long as these are not subject to interest or fees – from total assets. See Table 2-3 for sources of data collected for all Financial Institutions between 1990 (effectively 1995) and 2018. Coefficients marked with \*, \*\* and \*\*\* refer to the significance of abnormal returns at 90%, 95% and 99% confidence levels respectively.

**Table 2-14** also shows that performance in the year preceding cross border bank to bank mergers have limited influence on shareholders' value creation despite the negative association of other expenses to assets ratio. Results reflect the importance of expenses control during the year of preparation for merger and starting the Intention to Purchase order procedures. However, when banks merge or acquire banks in the same jurisdiction (country or state), previous year performance does influence shareholder value and in the longer run. An outcome that echoes the informational symmetry and availability, because both bidders and targets investors are in the same markets and have access to more information than in cross border deals. Henceforth the evidence on the significant varying influence of efficiency, capital structure and cost on shareholders' value creation. Local and interstate bank to bank mergers express significant shareholders value adjustment concerning the pre-merger performance of bidding banks, especially in the long horizon. Bidding banks ROE, liquidity and net loans to assets ratio are all positively associated with BHAR (-50, +230). They are explaining bidders developing ability in the premerger year to engage in a merger with a local bank and sustain shareholders value during the rest of the merger year. This is also accompanied by a positive association of cost to income, which is most likely reflecting an increase in retained earnings from net income I preparation to consolidation rather increases in actual costs.

On the other hand, bidding banks can create and sustain long term shareholders value when their credit risk is lower through less exposure to loans compared to deposits. High return on invested capital in the pre-merger year appear to deprive shareholders value in both short and long horizon of bidding banks. It reflects the negative capital to assets ratio association, which justifies the growing base of assets for local banks driving their decisions to consolidation, with the best candidate where informational asymmetry and moral hazard are at their lowest, same industry (Banks) and same jurisdiction. Liquidity and economic value addition, in the pre-merger year, are negatively associated with creating ARs for insurance companies bidding for other insurance businesses in the same

jurisdiction (country or state). However, pre-merger year performance does not appear to affect insurance-focused mergers shareholders value in the long run.

The impact of financial performance in two years before the merger announcement does not appear to influence shareholders value in the short horizon, nor in the long horizon (See Appendix B). It is synthesised that two years before the merger is a long period and most likely irrelevant performance and events take place during such an extended period.

#### ***2.4.2.2 Post-merger performance and shareholder value***

Examining the post-merger performance helps guide financial institutions towards most profitable, efficient and value-creating merger strategies. Although ROE appears to associate with destroying shareholders value in the few days following the merger announcement of focused mergers, higher return on equity contributes to creating share value upon deal completion (+230 days). Net loans to assets ratio have a similar effect in market penetration strategies. Decreasing credit risk and cost to income ratio also contribute to creating shareholders value in short and long horizons.

**Table 2-14** also shows that focused FIs merger that leads to increasing returns on invested capital without significant scrutiny on cost and capital efficiencies tend to destroy shareholders value in the long run. Product developing FIs mergers can create shareholders value in the short run when bidders engage in credit risk decreasing and loans to deposit increasing strategies. It could seem straight forward for non-lending FIs, but more intricate banks and lending institutions. However, it would involve further scrutiny of borrowers and increasing capital and reserves for losses, which can prove costly on their operating income.

Table 2-14 Robust regression; Abnormal returns (CARs and BHARs), mergers Strategic orientation and merger year performance.

Robust Regression	Diversification; Obs = 37		Market Development; Obs = 164		Market Penetration; Obs = 238		Product Development; Obs = 14	
<i>Same Year Performance</i>	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)
ROE (%)	-0.0037608*	-0.4523764	-0.0004514	0.7753759	-0.0000704	1.388217***	-0.0051095***	0.5778506
Liquidity Ratio	-0.0222936	10.23322	0.0001111	0.67046	-0.0001043	-0.0973147	Omitted	Omitted
Cost to Income	-0.0100449	4.458271	0.0001122	-0.380633	-0.0002202**	-0.031265	0.2373553	-241.3461
Capital to Assets	-0.1069128	6.02668	0.0283422	7.456888	0.0108178	10.73502	0.6834289	-130.5877
Net Loans to Assets	0.0175674	-99.23474	-0.0260673	-9.487603	0.0033198	61.00776***	0.5524217**	-958.4185***
Credit Risk	0.0746083	-129.1193	0.0322312	-4.136745	-0.0100317***	-2.370785	-0.4730887***	164.6871
Loans to Deposits Ratio	0.0585622	-68.10497	0.0019959	-0.9315332	-0.0318809	-1.095604	0.3608599***	-387.0172***
Other Expenses to Assets	0.0137373	-6.351395	-0.0000183**	-0.0214588**	0.0002754	0.1017486	0.685783***	-77.47035
EVA (Scaled over Total Assets)	-1932.908	5295068	549.7002	-789938.3	-242.5662	-532194.1	1450.722	-2368524*
WACC	-0.0048185	6.495899	0.001627	0.5830469	-0.0001197	0.085174	-0.0188507***	30.07914***
ROIC	0.0084297	-3.415205	-0.0008622	-1.656224*	0.0006422	-0.8489064	0.0207043***	-0.1116314
cons	0.011283	119.9394	-0.009606	4.408114	-0.0093249	-51.06599	-0.3671247	485.8035

This table shows robust regression analysis results of CARs and BHARs over the financial performance variables of the year of the merger announcement, segregating FIs merger by deal types of Diversification, Market Development, Market Penetration and Product Development. EVA is the Economic Value Addition expressed in terms of Net Operating Profit After Tax (NOPAT), Total Invested Capital (TC), Cost of Capital (WACC) as  $EVA = NOPAT - WACC * (TC)$ . WACC is the Weighted Average Cost of Capital expressed as the sum product of the multiplication of cost of each capital component by its proportional weight and multiplied by  $1 - \text{Corporate tax rate}$ . ROIC which is the Return on invested Capital expressed as Net Operating Profit After Tax (NOPAT) divided by Invested Capital which is calculated by subtracting cash and non-interest bearing current liabilities (NIBCL) – including tax liabilities and accounts payable, as long as these are not subject to interest or fees – from total assets. See Table 2-3 for sources of data collected for all Financial Institutions between 1990 (effectively 1995) and 2018. Coefficients marked with \*, \*\* and \*\*\* refer to the significance of abnormal returns at 90%, 95% and 99% confidence levels respectively.

Dissecting broader strategies into the industries of targets enable further insights. **Tables 2-15** and **2-16** summarise the association of the shareholders' value effect in several groups of focused and diversified mergers, with financial performance in the year of the merger announcement (65% Completion) and the following year (98.9% completion). Overall, the focused deals of bank-bank, real estate-real estate and insurance-insurance exhibit higher significance of the association between value creation and post-merger financial performance.

In year0, the announcement year, local bank to bank mergers create shareholders value and increases their liquidity and economic value in the short run. Furthermore, these deals enable bidding banks to increase returns (ROE) from lending (Loans to Deposits) and decrease credit risk along with the long-run share value increase. However, this is at the cost of deteriorating return on invested capital, liquidity and economic value. Symmetrical performance association is witnessed in the year following the merger announcement year (**Table 2-16**). When banks merge or acquire another bank in a different jurisdiction (Country or state), shareholder value creation is more drifted towards the announcement year-end (+230 days).

Furthermore, value creation in the long horizon appears to be involving high costs (the cost to income ratio) and higher risks (loans to deposits ratio and credit risk). Results in the year following the merger deal are also similar. It is most probably due to costs of cultural (Language, brand, legal) and procedural (regulations and regulators, organisational culture) differences leading to diminishing value; faster than local deals and incurring more costs to adapt and implement consolidations following the merger.

Real estate bidders that merge with another real estate firm across the border or state create shareholders value. Also, it accompanies increasing return on equity and economic value, although in the longer run, shareholder value creation comes at the cost of decreased liability and higher cost and expenses. However, focused real estate mergers appear to be more successful. They create

shareholders value in the short horizon, and this value is accompanied by enhanced liquidity, decreased expenses and economic value addition. However, costs to income and credit risk appear to become higher. As real estate firms are not lending firms, the increase in credit risk reflects the debts through loans that real estate companies often operate with to finance operations (land acquisitions and developments).

Insurance companies focused mergers can create value in the short horizon post-merger, only at the expense of lower liquidity and increased and supplementary expenses. They are also able to create value and decrease credit risk simultaneously. Since insurance companies are not lending firms by nature, the decrease in credit risk reflects the growing savings from premiums collected compared to loans or reassurances on account expenses. Results are consistent with a year post-merger and cross border and cross-state mergers, especially for expenses and credit risk. In the long horizon, shareholders value cost geography diversifying insurance bidders more; in liquidity deterioration and economic value. However, it well enhances risk spreading (credit risk). It is a reflection of the nature of the insurance business, where diversification (geography) ultimately means less exposure to similar risks and the shortage in liquidity, due to costs of relocation and rebranding in the new market.

**Table 2-15 Robust regression; Abnormal returns (CARs and BHARS), mergers' Strategic orientation at Industry level and merger year performance.**

Same Year Performance	Market Development; Banks-Banks		Market Penetration; Banks-Banks		Market Development; Real Estate-Real Estate		Market Penetration; Insurance-Insurance		Market Penetration; Real Estate-Real Estate	
	Obs	65	Obs	160	Obs	61	Obs	39	Obs	39
	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)
ROE (%)	-0.0013682***	-0.2331997	-0.0008015	0.7490319	0.0024974***	3.106938***	-0.0008983	-0.2472485		
Liquidity Ratio	-0.0040399	-14.24734	0.3018339	-344.2176	-0.0006774	-1.349324	-0.0004286	-0.1653076		
Cost to Income	0.0034485	13.8749	0.0147183	-20.06527	0.0000562	-1.131766	0.002017	-0.2172476		
Capital to Assets	0.1079465***	-17.57686	-0.1782799	-254.5458	-0.0636001	162.6763	0.0222323	-122.7531		
Net Loans to Assets	-0.0347126	-33.35238	-0.0195822	-63.52782	-0.0888754	29.6852	-0.0018519	84.03729		
Credit Risk	0.0384792	36.85132	0.0554799	-81.95032	0.0838785***	-13.71118	-0.0110995***	86.31245		
Loans to Deposits Ratio	0.0027055	6.224058	0.0039206	7.53909	0.0463866	-51.89359	-0.0262379	89.19227*		
Other Expenses to Assets	-0.0000206	-0.0306147	-0.0958437	116.0788	0.0003924	1.585535	0.0002778	0.3732841		
EVA (Scaled over Total Assets)	2704.869***	-567253.9	-1562.86	-484566.4	-1523.544	-1689681	-328.2599*	-2609867***		
WACC	0.0056758	1.22997	0.0011242	0.0902215	0.0010615	1.805315	-0.0045574	4.58476		
ROIC	-0.0026581	-0.9980524	0.0003202	0.1369412	0.0000443	-6.09418*	0.002691	-1.948055		
cons	-0.0032397	32.63346	0.0050021	85.96623	-0.029955	-63.61977	0.0139149	-106.3735		

This table shows robust regression analysis results of CARs and BHARs over the financial performance variables of the year of the merger announcement, segregating FIs merger by deal types of Strategic Orientation (Diversification, Market or product development, and Market Penetration) and Product Orientation depending on Acquirers and Targets Industries. Where ROE (%) is the Return on Equity - Total (%), Liquidity Ratio is (Current) Assets divided by Total Deposits(banks) or money held by the financial company on behalf of its customers. , Cost to Income Ratio is Operating Expenses divided by Revenue (Sales), Capital to Total Assets Ratio is the Total Capital divided by Total Assets, Net Loans to Total Assets is the Net Loans divided by Total Assets, Credit Risk is the Loan loss provision divided by Net interest revenues, Loans to Deposits Ratio is the Customer Loans divided by Customer Deposits, Other Expenses to Total Assets is the Other Expenses divided by Total Assets, EVA is the Economic Value Addition expressed in terms of Net Operating Profit After Tax (NOPAT), Total Invested Capital (TC), Cost of Capital (WACC) as  $EVA = NOPAT - WACC * (TC)$ . WACC is the Weighted Average Cost of Capital expressed as the sum product of the multiplication of cost of each capital component by its proportional weight and multiplied by 1 - Corporate tax rate. ROIC which is the Return on invested Capital expressed as Net Operating Profit After Tax (NOPAT) divided by Invested Capital which is calculated by subtracting cash and non-interest bearing current liabilities (NIBCL) – including tax liabilities and accounts payable, as long as these are not subject to interest or fees – from total assets. See Table 2-3 for sources of data collected for all Financial Institutions between 1990 (effectively 1995) and 2018. Coefficients marked with \*, \*\* and \*\*\* refer to the significance of abnormal returns at 90%, 95% and 99% confidence levels respectively.

**Table 2-16 Robust regression; Abnormal returns (CARs and BHARs), mergers' Strategic orientation at Industry level and post-merger performance.**

Robust Regression	Market Development; Banks-Banks		Market Development; Insurance-Insurance		Market Penetration; Banks-Banks		Market Penetration; Insurance-Insurance	
	Obs	71	Obs	43	Obs	161	Obs	39
Following Year Performance	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)
ROE (%)	0.0028094***	-0.1763202	0.0009113	0.0450332	-0.000142	2.524029***	-0.0007751	-1.378561
Liquidity Ratio	0.0062964	16.64739	0.041355***	-18.98488	-0.0004387**	-0.1179609	-0.0006505	0.5436189**
Cost to Income	-0.006275	-15.64204	0.007188	-3.673021	0.0003288	0.3122697	0.0026271	-3.060402
Capital to Assets	0.141338**	8.834888	-0.1427328	-190.5754	0.0611884	68.65279	-0.0038664	114.0591
Net Loans to Assets	-0.0560679	14.66895	-0.0297536	-73.96386	0.0143987	22.09079	-0.1317005	-65.29675
Credit Risk	0.0345613	110.6529***	-0.0091751	-7.409785	0.0347408	-47.79124***	0.1343524*	24.19299
Loans to Deposits Ratio	-0.0075278	-16.34848	-0.0180732	11.10207	-0.0004401*	-33.82192	-0.0922147	-68.91249
Other Expenses to Assets	-0.0000199	-0.0337735	-0.0417691***	17.44217*	0.0000804	-0.041245	0.0003328*	0.0096082
EVA (Scaled over Total Assets)	271.3935	2739218***	2042.087	-1770963	139.6755	-141132.5	-1377.515	1502376
WACC	-0.002381	8.67838	0.0052531	-1.706715	-0.0006203	-2.345198	-0.0010235	-3.218838
ROIC	0.0001069	-8.452928*	-0.007597	-1.247975*	0.0004702	-1.849043	0.0064777	9.868609**
cons	-0.0195922	2.386944	0.0361969	85.40327	-0.0252846	-11.3713	0.028121	16.8919

This table shows robust regression analysis results of CARs and BHARs over the financial performance variables of the year After the merger announcement, segregating FIs merger by deal types of Strategic Orientation (Diversification, Market or product development, and Market Penetration) and Product Orientation depending on Acquirers and Targets Industries. Where ROE (%) is the Return on Equity - Total (%), Liquidity Ratio is (Current) Assets divided by Total Deposits(banks) or money held by the financial company on behalf of its customers. , Cost to Income Ratio is Operating Expenses divided by Revenue (Sales), Capital to Total Assets Ratio is the Total Capital divided by Total Assets, Net Loans to Total Assets is the Net Loans divided by Total Assets, Credit Risk is the Loan loss provision divided by Net interest revenues, Loans to Deposits Ratio is the Customer Loans divided by Customer Deposits, Other Expenses to Total Assets is the Other Expenses divided by Total Assets, EVA is the Economic Value Addition expressed in terms of Net Operating Profit After Tax (NOPAT), Total Invested Capital (TC), Cost of Capital (WACC) as  $EVA = NOPAT - WACC * (TC)$ . WACC is the Weighted Average Cost of Capital expressed as the sum product of the multiplication of cost of each capital component by its proportional weight and multiplied by 1 - Corporate tax rate. ROIC which is the Return on invested Capital expressed as Net Operating Profit After Tax (NOPAT) divided by Invested Capital which is calculated by subtracting cash and non-interest bearing current liabilities (NIBCL) – including tax liabilities and accounts payable, as long as these are not subject to interest or fees – from total assets. See Table 2-3 for sources of data collected for all Financial Institutions between 1990 (effectively 1995) and 2018. Coefficients marked with \*, \*\* and \*\*\* refer to the significance of abnormal returns at 90%, 95% and 99% confidence levels respectively.

### **2.4.3 Mergers and acquisitions and regional differences**

A multifactor analysis is also conducted to distinguish among significant association between short and long horizons shareholders value and financial performance. The financial performance variables are segregated over regions and over the course of one year before the announcement, the announcement year and a year post announcement. Data also shows that bidding banks in Latin America have the most active association of pre-announcement financial performance with shareholders value. They also notably exhibit consistent direction and growing magnitudes of these variables from the short horizon to the long horizon. However, ROE and liquidity positive association and expenses negative association are sound signals, Latin American focused bank merger run a substantial risk. This connotation is apparent in the significant positive credit risk association with BHARs, and in the acutely declining association of loans to assets ratio and loans to deposits ratios. Returns on invested capital also show significant negative coefficient over the long horizon abnormal returns. Similar behaviour is witnessed in the announcement and post-announcement financial variables. An explanation for such conduct descends from the theory of more significant risk brings bigger returns. This is clear in the process where Latin American bidding banks and target banks join forces to run the same style of high-risk lending. While little attention paid to the economic value addition and the cost of capital, and more considerable attention to shareholders value and return on equity (ROE in the post-announcement year returned to positive after it was negative in the year of the announcement and become five folds greater than pre-announcement figures).

Australian banks to banks M&As have a less significant association between financial performance and shareholders value. The highest significance is in the pre-merger announcement year. Comparing the shift from short to long horizons association with financial variables permit to summarise that: Australasian acquiring banks have enhanced liquidity along with share value in the

long run along with decreasing other expenses and credit risk, but at the higher cost of capital and lower return on equity and invested capital. European focused bank mergers have associated the short-term share value creation with a declining return on equity, liquidity and economic value. However, they succeed in decreasing risk and capital to assets ratio. Announcement year financial performance is not significantly associated with shareholders value creation in the long horizon. North American bank focused mergers can associate shareholders value creation with decreasing credit risk and other expenses. However, it is also associated with the increased cost to income ratio (operating) and lower liquidity. Probably because loans to deposits are showing a negative association, it is reflecting the decreased ability of banks to increase loans and income from them during consolidation (measures are announcement years’).

Economic value addition captures the real economic profit of a firm as it is grounded on the residual wealth calculated by deducting the cost of capital from operating profit and adjusting for taxes on a cash basis. Hence, EVA the economic profit of the business. Furthermore, due to EVA’s methodological importance in providing the net effect of business profits, EVA is examined in the post-merger year along with merger year abnormal returns and other financial variables. This also enables us to test for “shareholders value efficiency” following Fiordelisi (2007) by examining EVA change from year0 (merger) to year1 (post-merger) relative to return on invested capital.

**Table 2-17 (Panel A)** shows that in banks-banks mergers economic value post-merger is driven mainly by an expansion in loans (Loans to T. Assets ratio) in North American and Australasian bidding banks. Shareholders value also drives long-run economic value for North American bank bidders. However, economic value is “subtracted” post-merger due to extremely low liquidity in North America, and US but cross-state mergers specifically. EVA is also negatively influenced by the broad base of loans compared to deposits, hence credit risk, and low net loans to assets in Australasian bank focused mergers.

Long run shareholders value, along with liquidity lower costs higher capital ratio and lower risks in the merger year, helps Latin American bank bidders gain economic value post-merger. For European bank mergers, the evidence relatively mixed. Long-horizon shareholders value contributes to generating economic value for cross border bank mergers, despite high capital to assets ratio and low return on equity. Cross border bank mergers in Europe allow banks to decrease credit risk significantly and increase return on invested capital along with improving economic value. Particularly, because diversity in banks loans enables betterment in credit risk strategy (Altunbas and Ibanez, 2008; Hagendorff *et al.*, 2012). However, examining the “shareholder value efficiency” theory shows that European bank to bank M&As, in general, decrease bidder shareholders value efficiency through negative returns on invested capital (**Table 2-17 (Panel B)**). Evidence on other mergers in other areas is not significant in this regard. Non-bank financial mergers do not provide evidence on the association of share value in the short or long horizons with creating economic value post-merger. Furthermore, empirical evidence suggests that Real estate-focused merger cross state and interstate (US) destroy economic value post-merger when they tend to increase return on equity and operating costs, or to increase capital (capital to assets ratio).



## 2.5 Conclusion

The financial sector has continuously experienced restructuring and reformation; either through re-regulation following crisis or deregulation following innovation. This synthetic cycle (Kane, 1981a, 1977) can be eased when economic and political powers find the optimal financial institution structure that can sustain a permanent, idiosyncratic and comprehensive risk-return enhanced status. One way of arriving at such status is through financial institutions consolidation and mergers and acquisitions.

This study contributes to the renewed policy debate, especially following the 2008-2011 crisis, by examining the value creation effect of financial institutions mergers and their determinants. It examines FIs shareholders value creation in the long and short run, as well as against the firm's financial performance pre- and post-merger. The methodology categorises merger deals over geographic, product and strategic orientations to devise the optimal type of FIs mergers and acquisitions. The study develops on the current finance literature by providing a triangulated approach examining; **a)** abnormal returns in the short run to evaluate markets' immediate perception of various deals orientations, **b)** abnormal returns in the long run to assess the continuity of such perception and **c)** their financial performance variables.

Results show that FIs mergers destroy value for the bidding firms pursuing a Market penetration strategy but show no significant share value adjustment in the long run. Market and Product Development strategies enable value creation for shareholders both in the short and the long run. However, Diversification strategies do not appear to have a significant influence on acquiring FIs shareholders value both in the short and in the long run. Megadeals, with a value of US\$10 Billion, appear to preserve more value for bidding FIs shareholders than those involved in a non-mega deal, by ten folds difference in BHARs. Financial institutions mergers that are paid by \$US currency create

significantly more value for bidders, in the short run than the ones paid for in Euro and British Pound. Payment in bidders' local currencies has a long-lasting value effect with BHARs being positive and significant until 230 days after the deal announcement. When the deal is paid for by "Cash" the short and long-horizon effect is significant and positive. However, deals paid by "Stock" or "Cash or Stock" exhibit negative small magnitude CARs. The 2008-2011 crisis appears to have a long-lasting negative effect on shareholders' value; BHARs during the financial crisis were consistently negative and 4 to 7 times greater than those of the same windows before the crisis.

Local bank to bank mergers creates shareholders value and can increase their liquidity and economic value in the short run. These deals enable bidding banks to increase returns (ROE) from lending (Loans to Deposits) and decrease credit risk along with the long-run share value increase. However, this is at the cost of deteriorating return on invested capital, liquidity and economic value. Bank to bank cross border mergers create shareholder value for bidders in the long run but is associated with high costs and higher risks (Loans to deposits and credit risk). It is most probably due to costs of cultural and procedural (regulations and regulators, organisational culture) differences leading to diminishing value. Cross border and US cross states Real Estate focused mergers create shareholders value and can enhance return on equity and economic value. However, their long-run shareholder value comes at the cost of decreased liability and increased cost and expenses. Nevertheless, focused real estate mergers appear to be more successful. Insurance companies focused mergers can create value in the short horizon post-merger, only at the expense of lower liquidity and increased expenses.

Bidding banks in Latin America have the strongest (p-value) association of pre-announcement financial performance with shareholders value. Although their enhanced ROE and liquidity, Latin American focused bank mergers seem to operate high credit risk and provide little attention to economic value addition and cost of capital. Australasian acquiring banks have enhanced liquidity

along with share value in the long run along, decreasing other expenses and credit risk, but at the higher cost of capital and lower return on equity and invested capital. European focused bank mergers have associated the short-term share value creation with a declining return on equity, liquidity and economic value. However, European focused bank mergers also succeed in decreasing risk and capital to assets ratio. North American bank focused mergers can create shareholders value along with decreasing credit risk and other expenses. However, it is also associated with the increased cost to income ratio and lower liquidity. They are probably reflecting the decreased ability of banks to increase loans and income from them during consolidation (measures are announcement years'). Bank to bank mergers' economic value post-merger is primarily driven by an expansion in loans (Loans to T. Assets ratio) in North American and Australasian bidding banks. Shareholders value also drives long-run economic value for North American bank bidders. EVA is also negatively influenced by the wide-ranging base of loans compared to deposits, hence credit risk, and low net loans to assets in Australasian bank focused mergers.

Variations in regional results emphasise on the need for regional and jurisdictional adaptations of any regulatory reform and the adoption of local assessment techniques. A theme that contributes to tackling regulatory arbitrage when customised to local conduct and in line with international guidelines simultaneously.

This research emphasises on the future role of innovation through market penetration strategies. There is a high likelihood that financial markets will witness the expansion of traditional banking models over the diversified ones (DeYoung, 2012). In practice, innovation will be in the form of banks funding their retail loans by a more significant percentage of bank deposits rather than asset-backed securities, along with retrenchment of credit availability for sub-prime borrowers. The rise of Financial Technology (FinTech) enables such activities, which would enable significant financial and informational efficiency when utilised alongside securitisation as a positive technique. Hence,

highlighting the advantage of not discontinuing securitisation but building on it, conditioned by more prudence by lenders, more diligence by investors, and greater regulatory oversight through accompanying regulatory technology (RegTech) and encouraging a FinTech strategy of mergers and acquisitions.

## 2.6 Appendix

### 2.6.1 EVA Calculation

The accounting adjustments made to move the book values closer to their economic values in the EVA calculation

$$EVA_{t-1,t} = NOPAT_{t-1,t} - (CI_{t-1} * K_{t-1,t}^e)$$

$NOPAT_{t-1,t}$  = EBIT (1 – tax rate) +  
 + R&D Expenses  
 + Training expenses  
 + Operating Lease Expenses  
 + Loan loss provisions – Net charge-off  
 + Book tax provisions – Cash operating tax  
 + General risk provisions – Net charge-off

$CI_{t-1}$  = Book value of equity  
 + Capitalised R&D expenses<sup>(1)</sup>  
 + Capitalised training expenses<sup>(1)</sup>  
 – Proxy for amortised R&D expenses<sup>(2)</sup>  
 – Proxy for amortised training expenses<sup>(2)</sup>  
 + Proxy for the present value of expected lease commitments over time<sup>(3)</sup>  
 – Proxy for amortised operating lease commitments<sup>(3)</sup>  
 + Net Loan loss reserve  
 + Deferred tax credits  
 – Deferred tax debits  
 + General Risk Reserve

Where NOPAT is the Net Operating Profits after Tax, CI is the capital invested,  $K_e$  is the estimated cost of capital invested, EBIT is the Earning before interest and taxes, R&D is "Research and Development"

- (1) Capitalised R&D expenses and capitalised training expenses are obtained summing annual R&E expenses and training expenses, respectively, over a period of five years (e.g. Stewart, 1991 suggests that five years is the average useful life of R&D expenses).
- (2) The proxies for amortised R&D expenses and amortised training expenses are obtained by dividing the capitalised amount of R&D expenses and the capitalised training expenses, respectively, over 5 years (assuming a straight-line amortisation process)
- (3) Since data availability does not allow us to evaluate the present value of expected lease commitments over time, the present value of expected future lease commitments capitalised is assumed to be equal to the overall amount of operating leases expenses over for a five years period. The amount annually amortised is close to the amount of R&D expenses divided by 3 years (assuming a straight-line amortisation process).

## 2.6.2 Two Years of Pre-merger performance effect

Multivariate regression of CARs and BHARs over financial performance variables two years before the merger announcement.

Two Years Pre-Merger Performance	Diversification	Obs=35	Market Development	Obs=143	Market Penetration	Obs=195	Product Development	Obs=14
	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)	CAR (-1, +3)	CBHAR (-50, +230)
ROE	-0.00081	0.493893	0.0000333***	0.0122276***	0.000629	0.8304693*	-0.00413	4.243164
Liquidity	-0.01235	-17.3819	0.000465	0.522244	-0.00054	0.433553	0.06619	-537.835
Cost to Income	-0.00192	-3.1823	0.000133	0.521256	-2E-05	0.084807	0.028862	170.9193
Capital to Assets	0.312825	196.7809	0.052442	43.53461	0.034268	-31.9674	-0.04836	80.88622
Net Loans to Assets	0.06362	-50.0106	-0.04521	10.97076	0.000386	41.19885	-0.29034	-435.16
Credit Risk	0.04249	-31.245	0.017143	23.42489	-0.02308	-5.07881	-0.17824	-242.576
Loan to Deposits	-0.06048	-103.184	0.002186	0.573171	-0.02251	12.43426	0.169484	-358.238
Other Expenses to Assets	0.004718	6.783879	-0.00014	-0.51602	0.000036	-0.03305	-0.05888	338.8598**
EVA	-0.00000032*	-4.8E-05	2.22E-09	0.0000717***	-2.8E-08	0.000014	3.04E-07	4.43E-05
WACC	-0.01009	2.988828	0.000597	0.790969	0.0027598*	0.768753	0.010925	24.67994
ROIC	0.0100773*	0.16868	0.001529	-2.529476*	-0.00052	-0.854	0.0008335**	-0.6594336**
_cons	-0.08153	-6.89873	-0.01519	1.074158	-0.02432	-31.3213	0.190577	156.5659
	F(11, 23)	2.4	F(11, 131)	216.93	F(11, 183)	1.01	F(10, 2)	0.000
	Prob>F	0.0371	Prob>F	0.000	Prob>F	0.4357	Prob>F	0.000
	R-squared	0.3226	R-squared	0.01136	R-squared	0.0616	R-squared	0.9291
	Root MSE	0.04615	Root MSE	0.05287	Root MSE	0.04334	Root MSE	0.0302

Shows robust regression analysis results of CARs and BHARs over the financial performance variables of the Two years Before the merger announcement segregating FIs merger by deal types of Diversification, Market Development, Market Penetration and Product Development. Coefficients marked with \*, \*\* and \*\*\* refer to the significance of abnormal returns at 90%, 95% and 99% confidence levels respectively.

### 2.6.3 Mixed Effect ML regression of CARs and BHARs, excluding ROI

<i>Mixed Effect Maximum Likelihood</i>	<i>Acquirer is a Bank</i>	<i>Banks-Banks</i>		<i>Banks-Insurance</i>	
<i>Same Year Performance</i>	<u>Obs = 532</u>	<u>Obs = 268</u>		<u>Obs=14</u>	
	<b>CAR (-1, +3)</b>	<b>CAR (-1, +3)</b>	<b>CBHAR (-50, +230)</b>	<b>CAR (-1, +3)</b>	<b>CBHAR (-50, +230)</b>
ROE	-0.000107	-0.0006445	0.2825468	0.0007199	1.190023
Liquidity	0.0000318***	-0.0002066***	-0.1853883***	0.7017472***	-952.0654***
Cost to Income	-0.0000221***	0.0002251***	0.1939322***	-0.6231185***	839.3732***
Net Loans to Assets	-0.0251165***	-0.022541*	16.07988	-0.1607536***	32.81271**
Credit Risk	-0.0054364	0.0127069	-2.928893	0.1312541***	-238.3513***
Loan to Deposits	0.0022413	0.0049707	-5.368608	0.0258868*	32.53
Other Expenses to Assets	-0.000013***	-0.0000213***	-0.0218421***	-0.4378624***	594.0668***
EVA	2.86E-09	1.42E-08	-0.00000161	-0.000000771**	0.0005452***
WACC	0.00114	0.0018389	-0.1230434	0.0120207***	-4.895462
<b>Wald chi(9)</b>	<b>73356.88</b>	<b>76740.62</b>	<b>64996.22</b>	<b>0</b>	<b>0</b>
<b>Log pseudolikelihood</b>	<b>829.2175</b>	<b>424.0296</b>	<b>-1491.71</b>	<b>33.82578</b>	<b>-64.4736</b>
<b>Prob&gt;chi2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Country of Acquirer Clustered Robust, Mixed Effect Maximum Likelihood regression analysis results of CARs and BHARs over the financial performance variables of the year of the merger announcement, segregating FIs merger by deal types of Acquirer Industry and deal Orientation (Diversification, Market or product development, and Market Penetration). Coefficients marked with \*, \*\* and \*\*\* refer to the significance of abnormal returns at 90%, 95% and 99% confidence levels respectively. N.B. GLM Gaussian distribution regression over same clusters resulted similarly.

### **3 Regulation and bank efficiency, productivity and overall performance**

### 3.1 Introduction

Since the great depression in the 1930s until the 2008-2011 aftermath regulations, there have been waves of financial crises, regulation and deregulation. The waves of distresses and default and corrective regulations date back more than 800 years ago (Reinhart, 2008; Reinhart and Rogoff, 2014). Following the 2008 financial crisis, there have been calls for re-regulation and ring-fencing of financial services (Financial Services Act (2013), Dodd-Frank Act (2010) and Liikanen (2012) report). Recently, in 2018, concerns about the ability to generate profit in the realm of the tightened regulation arose. Banks claim that the new banking regulations, introduced as a response to the 2008-2011 crisis, reduce market liquidity<sup>35</sup> (Walker, 2014). Especially, as it is currently considered to be transforming banks' ability to mitigate risk and instability (Athanasoglou *et al.*, 2014). Specifically, when realising that post-crisis acts have not contributed to fundamental changes in banks approaches and practices (Barth *et al.*, 2015; Epstein and Montecino, 2015).

Although there exists a broad consensus on the importance of efficient and healthy banking system, the evidence on how this system should be regulated to function properly diverges. Supporters and contenders of stricter bank regulation claim targeting economic growth through enhancing resilience, operations and functions of the banking industry (Levine, 1997, 2005). The reason being poorly functioning banking systems impede economic progress, exacerbate poverty, and destabilise economies (Barth *et al.*, 2001b). However, the literature on banks behaviour and functionality provides evidence on their misconduct and malfunctioning, especially in times of distress. This controversy heightens when examining regulatory responses to the financial crisis, and

---

<sup>35</sup> Higher capital reserve requirements, that are buffers to cover for business and credit risks, decrease a) funds available for banks for lending and investing which decreases sales volumes and consequently profits and b) dries banks most liquid assets (cash and cash equivalents).

the following banks and markets perceptions of these regulations. This dialectic reflects mixed evidence in the literature regarding the impact of regulatory reforms on banks productivity, competition, production technology and efficiency improvements. Some studies report improvements in productivity following financial reforms, while others suggest little or negative productivity growth<sup>36</sup>. Henceforth, re-emphasising the regulatory-performance dialectic (Kane, 1981b) and motivating research into the impact of renewed regulations on bank performance<sup>37</sup>.

This chapter contributes to the literature by examining the relationship between the implementation of regulatory standards and the performance of the banking sector following a structural model<sup>38</sup> of the banking firm and the concept of optimisation (Hughes and Mester, 2014). Hence, this chapter explores the impact of different regulatory reforms on banks performance of Total Factor Productivity (TFP) and its component efficiencies and its association with bank-specific variables of profitability and equity and with macro-level variables of economy and freedom. More explicitly, the study examines the impact of; (i) regulatory and supervisory policies related to Basel accords pillars of capital and market discipline through private monitoring, (ii) restrictions on bank

---

<sup>36</sup> Detailed reviews of the impact of financial reforms on the productivity change of banking systems are analysed in Mukherjee et al, (2001), and Kumbhakar and Sarkar (2003).

<sup>37</sup> Following the early great depression of 1930s, U.S. financial markets witnessed the passage of restricting bank activities regulations that affected commercial bank growth especially those that trade securities directly or via affiliates (Westerfield, 1933). Technological advances and the consolidation wave of the late 1980s in financial and industrial sectors formed a pull pressure on regulators who started permitting limited trading. The Gramm–Leach–Bliley Act (Financial Services Modernisation Act - FSMA) officially annulled most of the acts that limited the activities of U.S. banks in 1999 (Yeager *et al.*, 2007). In 1989, Europe also adopted a liberalising strategy through the Second Banking Directive (Romero-Ávila, 2007; Demyanyk *et al.*, 2007a). However, following the 2008-2011 crisis, Liikanen *et al.* (2012) reported several recommendations to restrict proprietary trading and other significant trading activities in order to remove support given by deposits and their guarantee to risky trading activities.

<sup>38</sup> The structural model of the banking firm adopts strategies and deploys methods to optimise performance that improve the resilience of firms through enhancement of efficiencies of its inputs and outputs and inline to minimise systemic risk.

activities and (iii) Economic and financial freedoms on TFP growth and year-end performance in banking. An additional contribution of this study is that it examines across economies with different levels of income<sup>39</sup> based on the Gross National Income (GNI) per capita. Low-income economies are those with a GNI per capita of \$995 or less, lower-middle-income economies are those with a GNI per capita between \$996 and \$3,895; upper-middle-income economies are those between \$3,896 and \$12,055, and high-income economies are those with a GNI per capita of \$12,055 or more.

The current literature on bank productivity provides mixed results varying over the kind of regulation and their impact. Tirtiroğlu *et al.* (2005) argue that banking restrictions, in the US, decreases productivity growth, while relaxing restrictions on intrastate branching expansion provide a positive long-run influence upon banks' productivity growth. However, Delis *et al.* (2011b) indicate that regulations, in transition economies, that promote private monitoring and allows banks' activities of securities, insurance and real estate have a positive impact on productivity. However, regulations increasing capital requirements and supervisory power do not have a significant impact on productivity. In Europe, strengthening capital restrictions and official supervisory powers improve the efficient operations of banks.

Furthermore, in Europe, private monitoring and restricting bank activities can result in higher bank inefficiency levels (Chortareas *et al.*, 2012). Tanna *et al.* (2017) find that the net effect of

---

<sup>39</sup>The GNI per capita is calculated using the Atlas method which uses the Atlas conversion factor instead of simple exchange rates. The purpose of the Atlas conversion factor is to reduce the impact of exchange rate fluctuations in the cross-country comparison of national incomes. The Atlas conversion factor for any year is the average of a country's exchange rate for that year and its exchange rates for the two preceding years, adjusted for the difference between the rate of inflation in the country and international inflation; the objective of the adjustment is to reduce any changes to the exchange rate caused by inflation (Bank, 2019).

financial liberalisation enhances bank TFP growth. However, most of the recent empirical literature is on the US, or European and transition economies, highlighting paucity in cross-country evidence, especially accompanying recent developments in financial regulations and markets restructuring. Therefore, this chapter seeks not only to associate bank productivity, and incumbent efficiencies, to their determinants, but also to investigate the productivity–regulations nexus from a cross-country perspective. For the reason that “Analysing productivity differences across countries may help to identify the success or failure of policy initiatives” (Casu *et al.*, 2004a) (p. 2522).

Our results show a negative relationship between productivity growth and capital requirements, supervisory power and activity restrictions. This result proves the general propensity of banks towards freeing more proportions of their capital to enable investments and expanding profit and value. It also proves that banks tending to diversify activities towards insurance and securities are rewarded by enhanced productivity growth compared to focused bank activity. Evidence also suggests that banks prefer private monitoring over close formal supervision. This allows to promote corporate governance practices and incentivise banks to adopt them, instead of the direct imposition of strict and profit limiting measures of restrictions and capital requirements.

Furthermore, productivity growth is positively associated with market volatility and credit to deposits ratio; indicating banks’ general appetite towards risk-taking and more technically towards offshore and off-balance-sheet businesses that can contribute to banks inputs (Khan *et al.*, 2017). Banks productivity growth appear to have been impaired during the 2007 financial crisis, despite the strengthening technical and scale efficiencies. A vital aspect of this decline was in the technological efficiency, proving the role of banks technological adoption and its role in sustaining other efficiencies through market efficiency enabling an adequate response (Santomero and Trester, 1998).

## 3.2 Literature review

Regulation in the banking sector is of high interest, to regulators, economists, scholars, and governments, due to its contribution to resilient banking sectors and economies. However, the impact of such regulations is still arguable and uncertain. A well-functioning regulatory and supervisory framework can help minimise moral hazard and discourage excessive risk-taking. Post-2008 crisis, questions arose about the suitability of the current regulatory setting, with several studies indicating weaknesses in regulation and supervision as one of the critical causes of the severity and depth of the crisis (Cihak *et al.*, 2013a; Merrouche and Nier, 2014). While efforts to strengthen regulation and supervision are well underway in many countries, there is no evidence that any standard set of rules is universally appropriate for sponsoring well-performing and resilient banks. Reforms that might thrive in some countries may not stand good practice in other countries that have different institutional or economic settings. There is no extensive cross-country evidence as to which of the many different regulations and supervisory practices employed around the world work best to promote financial stability (Barth *et al.*, 2013b).

In theory, Barth *et al.* (2008a) postulate two main views on the inconclusiveness of how regulation and supervision affect bank performance. They argue that two general views provide different predictions:

- A-** The “public interest view” that suggests that governments act in the interests of the public and regulate banks to promote efficient banking and ameliorate market failures (Keeley and Furlong, 1990; Kaufman, 1992). And
- B-** The “private interest view” that proposes that regulation is mostly employed to promote the special interests of the few, and not the broader public, thereby hindering bank performance.

These opposing views also have roots in empirical studies, with conflicting predictions, about the impact of specific regulations like capital requirements on bank performance<sup>40</sup>.

### **3.2.1 The impact of bank regulation and compliance on bank performance**

Investigating bank regulation and compliance by controlling for bank and system Z-scores<sup>41</sup>, Demirgüç-Kunt and Detragiache (2010) argue that, there is no robust association between Basel core principles and bank risk or system-wide risk. However, even rating agencies that were suspects of misconduct due to their failure in the assessment of banks and insurance companies (FCIC, 2011), tend to give higher credit ratings for compliant countries, which contradict with Demirgüç-Kunt and Detragiache (2010). Furthermore, Barth *et al.* (2004) argue that regulatory policies that force accurate information disclosure, empower private-sector corporate control and foster incentives for private agents to exert corporate control, work best to promote bank development, performance and stability. They also suggest that countries' specificity added to political, social and legal differences motivates regulations, controlling for regulatory arbitrage<sup>42</sup>.

Consequently, they emphasise that banking systems differ among jurisdictions; hence, there is no single rule to apply globally. Barth *et al.* (2004) correspondingly argue that there is no evidence that there is a universal best practice that is appropriate for promoting well-functioning banks". A

---

<sup>40</sup>For a detailed discussion of the relevant empirical literature see Barth *et al.* (2008a). Barth *et al.* (2004) and Demirgüç-Kunt and Detragiache (2010), to name few, pose clear differentiation between the public and private interest views.

<sup>41</sup> Z-score is calculated based on Return on Assets, and Equity to Assets ratio (capitalisation), where sd is the Standard Deviation;  $Z = (ROA + (\text{equity}/\text{assets})) / \text{St. Dev.}(ROA)$ .

<sup>42</sup> The inability to efficiently regulate risk-taking by banks when they are able to freely direct their investment flows worldwide (Boyer and Kempf, 2016).

logic that suggests that only empirical evidence can prove the questionable effectiveness of specific regulations and supervision frameworks, by following a methodology that divides sampling regions and countries. Hence, the feasibility of global regulatory reforms, such as the Basel accords, and their jurisdictions' adaptation are investigated for their stability, efficiency enhancement and development rather than just compliance.

### **3.2.2 Bank regulation and productivity**

Banking regulation and performance literature suggest different approaches to study their interdependency. The diversity of these approaches stem from applying different empirical methodologies that are also dependent on a wide array of variables of regulatory and systemic nature. Three different perspectives are adopted in analysing bank regulation and productivity (Hendrickson, 2011); central banks' policies, regulatory perspective and economic perspective.

Kindelberger and Aliber (2005) and Bagliano *et al.* (2000a) hold central banks responsible for their policies' contribution to financial and banking unrests. Examining European Central Bank conduct and its effect on European banks competition, they find that monetary policy tends to affect the degree of competitiveness in oligopolistic banking sectors and that monetary policy criteria, designed to achieve some desired macroeconomic targets, may result in a "softer", or "tougher", credit-market competition"<sup>43</sup>. Agénor and El Aynaoui (2010) have also studied the effects of

---

<sup>43</sup> Bank conduct is examined by modelling inter-banks competition at national level. The application of a single monetary policy favoured the setting-up of deep and liquid integrated money and capital markets that generated growth and triggered further competition in the Euro zone. The branch network and staffing levels, given the differences across countries, enable banks to achieve efficiency gains generated by improvements in services and procedures. Gains also stem from enhancements in the quality of services, staff and IT, risk management and internal control systems, cost-cutting, changes in product ranges (shift from operating services to consulting), reconsideration of product ranges, development of alternative sources of income (through geographical expansion and mergers, strategic alliances and co-operation agreements).

monetary policy on banks' performance. They argue that excess bank liquidity correlates with the effectiveness of the monetary policy.

However, another strand of literature embraces the economic perspective in examining bank regulation and performance. Temin *et al.* (1969), Temin and Norton (1976) and Ramirez (2009) relate bank instability and fragility and their consequences to the sharp drop in public consumption. Such drops lead to a contraction in spending and consequently lending; leading to slower recessionary business cycles and lowered banks' profits, and relatively higher banks fixed costs. Both, the Turner (2009) report in the U.K. and the Financial Crisis Inquiry Commission in the U.S. accuse economic macro-imbalances among countries of big economies<sup>44</sup> for the financial crisis.

Calomiris (2009a) links the economic response to the regulatory approach through broader governance of market structure. It shows how the market structure would influence banks' strategies, behaviour, and reaction towards innovations and panics resulting from demand and supply conditions or market imperfections. Furthermore, bank regulations cannot be viewed in isolation from economic variables of inflation and production, Demirgüç-Kunt *et al.* (2003) argue. They also postulate that bank regulation, over entry to new markets and activities (diversification into insurance, investment banking and real estate), boosts net interest margins and that inflation exercises a robust positive impact on bank margins.

Following Demirgüç-Kunt *et al.* (2003) and Delis *et al.* (2011b), this chapter examines the regulatory perspective, as it extends to reflect central bank policies and economic perspectives. A

---

<sup>44</sup> Between 1998 and 2008, the global economy has seen an explosion of world macro-imbalances (see exhibit in Appendix A); Oil exporting countries, Japan, China, and some other East Asian emerging / developing nations have accumulated large current account surpluses, while large current account deficits have emerged in the USA, the UK, Ireland, Spain and some other emerging markets countries.

methodology that examines the interdependencies and interactions of several regulatory frameworks on banks performance and productivity growth, in a cross-country and multi-period setup.

### **3.2.3 Bank regulations perspective determinants**

The theoretical banking literature is sharply divided concerning the effects of capital requirements on bank behaviour (Hoose, 2010). Barth *et al.* (2004) conclude that higher capital requirements have no significant impact on banking sector development. Ayadi *et al.* (2016a) also indicate that compliance with Basel Core Principles for Effective Bank Supervision, or any of its chapters, has no association with bank efficiency. However, Brun *et al.* (2013) argue that a one percentage point increase in capital requirements leads to a reduction in lending by approximately 10% for French banks between 2008 and 2011. For the reason that it creates a procyclicality, which drains out banks' most needed funds at the bottom of the credit cycle when liquidity is most needed to ward-off crunches. Pasiouras (2008b) finds a significantly positive correlation between supervision empowerment and banks' productivity enhancement through technical efficiency.

Tirtiroglu, Daniels, and Tirtigoglu (2005) examine the impact of U.S. intrastate and interstate deregulations on bank TFP growth and find that intrastate branching liberalisation has a positive long-run impact on productivity growth. Isik (2007) and Aysan and Ceyhan (2008) finds that the productivity of Turkish banking-sector reforms (BSRs) post-2001 improved significantly as the reform process accelerated. Gilbert and Wilson (1998) find that Korean banks responded to privatisation and deregulation during the 1980s and early 1990s by altering their mix of inputs and outputs, yielding substantial changes in productivity. In contrast to the above studies, Tirtiroglu, Daniels, and Tirtiroglu (1998) find a negative relationship between regulatory initiatives and TFP

growth in U.S. commercial banking over the period 1946–95<sup>45</sup>. Furthermore, Grifell-Tatje and Lovell (1996) conclude that the relaxation and removal of regulatory constraints in the Spanish savings bank sector, led to an increase in branching and merger activity although this could not explain the magnitude or nature of productivity decline found over the study period.

Censuring securitisation as one of the leading causes and propagators of the 2007 subprime crisis (FCIC, 2011), regulators are re-effecting the Glass-Steagall Act type of restrictions (Saunders *et al.*, 2006) through ring-fencing<sup>46</sup>. Activity restriction investigated in this study includes securitisation and Non-Bank activities such as insurance. Barth *et al.* (2008d), in their latest (third) survey (over 300 questions related to banks conduct and application of Basel II guidelines) argue that activity restrictions of securities, insurance, and real estate pose **no** significant impact on banks' risk-taking and hence system stability or fragility. On the contrary, they believe that other activities would enable banks to diversify their income streams and immunise their activities, contributing to resilience against shocks. Diversification might also "increase the franchise value of banks and thereby augment incentives for more prudent behaviour" (Barth *et al.*, 2008d). Delis *et al.* (2011b), Chortareas *et al.* (2012) and Tanna *et al.* (2017) arrive at similar results. Therefore, the impact of diversification (securities, insurance, and real estate activities) on bank performance is not yet conclusive. This reasoning provides further motivation for examining the banking sector performance in reaction to regulations and reforms that lead to mergers and or acquisitions.

---

<sup>45</sup> With the Federal Deposit Insurance Act of 1950, the Competitive Equality Banking Act of 1987, the Depository Institutions Act of 1982, and the Depository Institutions Deregulation and Monetary Control Act of 1980 being the most influential regulatory initiatives.

<sup>46</sup> Ring-fencing regulations aim at restricting Universal Banking (Koetter *et al.*, 2007).

Typically, the literature that focuses on regulations and productivity tends to; (i) examine individual countries, or group of countries in one policy mechanism (the EU case), (ii) evaluate overall regulatory reforms (usually captured by dummy variables) and productivity change over deregulation periods, and (iii) generally yield conflicting findings. The methodological approach of this study aims to shed more light on the regulations–productivity nexus, by using a cross-country setting to focus on specific regulatory indices that relate to the three pillars of Basel accords as well as country-specific stability, freedom and macroeconomic measures.

### 3.3 Data and Methodology

Analysing productivity differences across countries may help to identify the success or failure of policy initiatives or “may highlight different strategies undertaken by banking firms” (Casu *et al.*, 2004a). A resolution that justifies the purpose of probing banks’ Total Factor Productivity (TFP) growth and its changes. Primarily through examining TFP adaptations as a response to bank regulations and other macroeconomic factors in 2,155 medium and large banks operating in 93 countries<sup>47</sup>. Following Worthington (1999b) and Delis *et al.* (2011a), the Malmquist Output index is utilised to examine how bank regulations impact banks productivity and performance.

The Malmquist output index variations in response to regulations and business limitations are of interest from a policy perspective. Increased banks’ productivity leads to enhanced performance, lower prices, improved services for consumers and more excellent safety and soundness. They lead to enhanced capital buffers that help to absorb risk and decrease managers’ temptation for risky innovations through improved governance.

#### 3.3.1 Data set

This study examines Total factor productivity for commercial banks in response to regulatory reforms on an international scale. The dataset used in this study comprises bank-level data and

---

<sup>47</sup> Argentina, Australia, Austria, Bahrain, Bangladesh, Belgium, Belize, Bosnia And Herzegovina, Botswana, Brazil, Bulgaria, Canada, Chile, China, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Ecuador, Egypt, Finland, France, Gambia, Georgia, Germany, Ghana, Greece, Hong Kong, Hungary, India, Indonesia, Iran, Ireland, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Lebanon, Lithuania, Macedonia, Malawi, Malaysia, Malta, Mauritius, Mexico, Montenegro, Morocco, Namibia, Nepal, Netherlands, New Zealand, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Rwanda, Saudi Arabia, Senegal, Serbia, Singapore, Slovakia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Tanzania, Thailand, Togo, Trinidad & Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, United States, Venezuela, Vietnam and Zambia.

country-level data. They are compiled from a number of sources: (a) the IMF and World Bank Basel Core Financial Sector Assessment Program (FSAP) database, which includes a detailed assessment of a country's compliance with the Basel Core Principles for Effective Bank Supervision (BCP); (b) the Barth et al. (2004, 2006, 2008, 2012) surveys on bank regulation, supervision, and monitoring; (c) the World Bank Economic Indicators and the Heritage Foundation Freedom data sets; and (d) the **Datastream** and **Bloomberg** databases.

Country-specific data relevant to all banks are collected from the World Bank and Heritage Foundation data sets. Bank-level information comprises balance sheet and income statement data for all publicly quoted commercial banks and bank holding companies. For the reason that is publicly trading institutions are subject to more stringent regulatory controls and need to comply with international regulations, such as capital regulation, and they follow international accounting standards to report end-of-year accounting variables (Laeven and Levine, 2009). This examination focus on publicly quoted banks. When constructing the dataset, it excludes banks with missing information on relevant accounting variables (total assets, loans, other earning assets, deposits, equity capital and Bank regulatory capital as proxies for stability along with Z-score, interest and non-interest income, and interest and non-interest expenses). To prevent outliers from driving the results, input and output variables are Winsorised at the 1% level. Bank-level information is then matched with country-level information to investigate the link between regulatory compliance and bank performance, accounting for cross-country differences in macroeconomic and institutional factors. The final cross-sectional sample includes 2,155 banks across 95 countries over the period 1999–2017

(Table 3-1)<sup>48</sup>. The sample includes countries with vastly different banking systems and economic conditions, with some countries only represented by a few listed banks, while others have a much higher sample share. Explicitly, U.S. banks account for approximately 25% (296 banks) of the sample. Testing is carried with and without by U.S. banks to ensure that findings are not overly influenced by their sizable representation. Besides, countries are also classified into 11 geographical regions and income groups. Country-level regulatory data are collected in four survey exercises (1999, 2003, 2007 and 2011), following Barth et al. (2013) this study matches the data for the regulatory variables as follows: the 1999 survey data are used for period 1999–2002; the 2003 survey data are used for period 2003–2006, 2007 survey data are used for period 2007–2010, and the 2011 survey data used for the period 2011–2017.

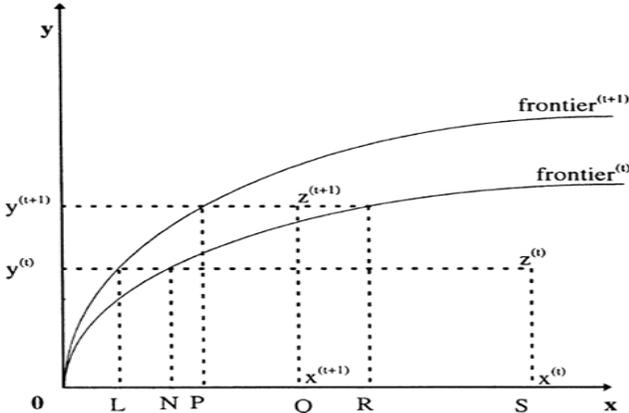
### **3.3.2 Methodology and Malmquist Index Construction**

Following Delis *et al.* (2011a) and (Worthington, 1999b), this chapter utilises a non-parametric frontier technique by calculating the Malmquist Output oriented index to estimate the TFP (Total Factor Productivity). The Malmquist index was first introduced by Malmquist (1953) as a consumer commodity index by applying the ratio of differences on vectors of inputs and outputs (distance functions). The primary commodity index was later extended, by Caves *et al.* (1982), to be the well-known Malmquist Total Factor Productivity (TFP) Index. The index has several essential features related to ease of modelling and estimation (Färe *et al.*, 2001). The components of the Malmquist index are ratios of distance functions making its estimation a straightforward technique using activity

---

<sup>48</sup> The original BCP assessment exercise (2011) examines 158 countries, principalities, and monetary unions; but because of data availability and the incomplete overlap among the four databases, the dataset's global span is reduced to 93 countries. Based on communication with the World Bank (Demirigc-Kunt), repeating this study with the updated bank regulation survey expected in Autumn 2020 would be very effective and insightful.

analysis or Data Envelopment Analysis (DEA) methods. This allows controlling for efficiency changes, depending on the reallocation of production frontiers signalling the technical change and the technical efficiency at once (Worthington, 1999b) as seen in the figure below;



**Figure 3-1 Malmquist Index and Productivity Change, Source (Worthington, 1999).**

For any given financial institution (FI) in period  $t$ , having the production frontier, input bundle,  $z(t)$ , the input-based measure of efficiency will be the horizontal distance ratio  $ON:OS$ . That is, inputs can be reduced in order to make production technically efficient in period  $t$ , which is the movement onto the efficient frontier.

Based on input distance functions, the Malmquist TFP index can be constructed to measure productivity change between periods  $s$  and  $t$ , based on period  $t$  technology;

$$m_i^t(y_s, x_s, y_t, x_t) = \frac{d_i^t(y_t, x_t)}{d_i^t(y_s, x_s)} \quad (a)$$

A similar input-oriented Malmquist index can be obtained based on period  $s$  technology as follows:

$$m_i^s(y_s, x_s, y_t, x_t) = \frac{d_i^s(y_t, x_t)}{d_i^s(y_s, x_s)} \quad (b)$$

The previous two equations imply that estimation of TFP change between the two periods could depend on the choice of technology. In order to escape the effect of any arbitrarily chosen technology, Färe et al. (1994) suggest estimating the input-oriented TFP as the geometric mean of the indices based on periods  $t$  and  $s$  technologies as given by the above-mentioned equations, respectively. Hence;

$$m_i(y_s, x_s, y_t, x_t) = \sqrt{\left[ \frac{d_i^s(y_t, x_t)}{d_i^s(y_s, x_s)} * \frac{d_i^t(y_t, x_t)}{d_i^t(y_s, x_s)} \right]} \quad (c) \text{ When the value of } m_i \text{ exceeds unity; this}$$

indicates a positive TFP growth from period  $s$  to period  $t$  and, a value of the index less than one indicates a decline in TFP growth. Eq. (4) can be re-written as

$$m_i(y_s, x_s, y_t, x_t) = \frac{d_i^t(y_t, x_t)}{d_i^s(y_s, x_s)} * \sqrt{\left[ \frac{d_i^s(y_t, x_t)}{d_i^t(y_s, x_s)} * \frac{d_i^s(y_t, x_t)}{d_i^t(y_s, x_s)} \right]}$$

The ratio outside the square brackets measures the change in the input-oriented measure of technical efficiency between periods,  $s$  and  $t$ . This efficiency change is equivalent to the ratio of the Farrell technical efficiency in period  $t$  to the technical efficiency in period  $s$ . The remaining part of the index indicates the shift in technology between the two periods. Thus, the Malmquist TFP index shows that productivity change is the product of technical efficiency change (called ‘catch-up’) and technological change (‘shift in frontier’). By comparison, in period  $t+1$ , inputs are multiplied by the horizontal distance ratio **OR:OQ** in order to achieve comparable technical efficiency to that found in period  $t$ . Hence, the Malmquist Output Oriented Index will be as follows:

$$M_0(y_s, x_s, y_t, x_t) = \sqrt{\left[ \frac{d_0^s(y_t, x_t)}{d_0^s(y_s, x_s)} * \frac{d_0^t(y_t, x_t)}{d_0^t(y_s, x_s)} \right]} \quad (3.1)$$

Where  $M_0$  measures the productivity change between periods  $s$  (base period) and  $t$ , and  $d_0^s(y_t, x_t)$  represents the distance from the period  $t$  observation to the period  $s$  technology.  $M_0 > 1$

indicates positive TFP growth from period  $S$  to period  $t$ ,  $M_0 < 1$  indicates a decline and  $M_0 = 1$  indicates constant TFP growth. This Index is used to assess banks' productivity and efficiency changes, by decomposing the TFP growth into; efficiency change (EFFCH), technological change (TECHCH), pure technical efficiency change (PECH), and scale efficiency change (SECH) using the DEA technique (Coelli *et al.*, 2005; Coelli, 1996; Färe *et al.*, 2001). Therefore, for data processing purpose, these efficiency variables that are collected at the individual firm level are then aggregated on the bases of the weighted average by assets and added to establish a country-level index of efficiency change (EFFCH), technological change (TECHCH), pure technical efficiency change (PECH), and scale efficiency change (SECH).

However, the dynamic version of the Malmquist index was criticised for creating circularity and that the adjacent period indices can give different productivity measures for the same data. This interface is corrected by time neutrality and fixed effects measures as discussed by Pastor and Lovell (2007). Hence, the possibility of having a complex serial correlation in the DEA efficiency study is minimised, especially that there is no generation of a single variable of compliance (Ayadi *et al.*, 2016a) instead, an analysis of all four regulation compliance measures beside Capital to Total Assets and Risk Weighted Regulatory Capital real values. This procedure will adjust for the bias in the first stage DEA estimates of bank efficiency. These bias-corrected efficiency scores are then used to improve statistical efficiency in the second stage truncated and multivariate regression estimates. This is done by applying a mixture of constant (CRS constant return to scale) and variable returns to scale (VRS variable return to scale) under the Data Envelopment technique involving calculation of technical and scale efficiency.

The methodology, hence, has two stages; the first is to calculate the Malmquist output-oriented index by applying equation (1) to estimate the distance changes in inputs and outputs of banks under

analysis<sup>49</sup> using a Data Envelopment Analysis procedure<sup>50</sup> (DEA). In the second stage, the outcomes of the Malmquist output-oriented indices are then used in the truncated regression, of equation (2) below, along with regulatory compliance factors, Macroeconomic and System risk and stability factors. This procedure helps to deduce how various (bank-specific and country-specific) factors influence the estimated efficiency (Simar and Wilson, 2007). Earlier studies suggest that the impact of regulation and supervision increases with the level of development (Barth *et al.*, 2004; Demirgüç-Kunt *et al.*, 2008). To assess whether regulatory compliance affects banks differently in countries at different levels of development, a separate estimations clustering of various markets and income groups is re-run;

$$M_{itc} = a_1 R_{t-1,c} + a_2 B_{itc} + a_3 Z_{tc} + u \quad (3.2)$$

Where  $M_{itc}$  is the TFP growth of bank  $i$  that operates in country  $c$  at time  $t$ ,  $R$  captures regulatory variables,  $B$  captures several bank-specific variables, and  $Z$  captures variables accounting for macroeconomic status common to all banks of a specific jurisdiction, and finally  $u$  is the error term. TFP growth and component efficiencies change reported in **Table 3-2** below.

### 3.3.3 Environmental variables (R)

**Regulatory variables** are extracted from surveys on regulatory policy and conduct<sup>51</sup> done by Barth *et al.* (2008d). Answers are encoded, as explained in Barth *et al.* (2013a), by assigning scores

---

<sup>49</sup> Namely; deposits, fixed assets, overheads, loans, other earning assets, and non-interest incomes as identified in the intermediation theory.

<sup>50</sup> Using software developed by Coelli (1996) and explained in the Centre for Efficiency and Productivity Analysis working paper No. 8/96.

<sup>51</sup> As indicated in “Bank Regulation and Supervision Database, World Bank; Barth *et al.*, 2001b, 2006, 2007b.

to different answers and then summing up the averages of totals to get a single country regulatory index. This index is later subdivided into Capital Requirements (CAPRQ), Supervisory Power (SPR), Market Discipline and Private Monitoring (PMON), Activity Restrictions (ACTR). Answers to this survey also show the extent of compliance with Basel II guidance. Appendix A details regulatory scores calculation. **Market Structure;** The proxy for the market structure is the concentration (CONC) index. CONC is measured as a ratio of the first five banks (assets size) to the whole sector as compiled by Beck and Demirgüç-Kunt (2009). This study advances to this approach and examines market influence and association with productivity change and regulation through the Lerner Index<sup>52</sup> for market power and market volatility through stock prices volatility<sup>53</sup>.

### **3.3.4 Bank Specific Variables (B)**

Inputs and outputs for the Malmquist Index calculation follow the financial intermediation model. Deposits and short-term funding are the primary sources of funds inflows. Fixed assets and overheads are used to make banks' production of mostly loans, other earning assets and non-interest income as a proxy for off-balance-sheet activities. Datastream and Bloomberg databases are used to download values of banks inputs and outputs that are tabulated in an order that serves the purpose of this investigation. The same database is used to extract the Equity to Total Assets ratio as a proxy for banks' capitalisation and reinvestment.

---

<sup>52</sup> Lerner Index is defined as the difference between output prices and marginal costs (relative to prices). Prices are calculated as total bank revenue over assets, whereas marginal costs are obtained from an estimated translog cost function with respect to output. Higher values of the Lerner index indicate less bank competition. Lerner Index estimations follow the methodology described in Demirgüç-Kunt and Martínez Pería (2010).

<sup>53</sup> Stock price volatility is the average of the 360-day volatility of the national stock market index, Bloomberg.

**Table 3-1** describes the full sample of 2,155 listed banks operating in 93 countries that belong to various regional and economic areas. It summarises bank-specific data used to synthesise the Malmquist productivity index (Inputs and outputs) and country-specific economic and regulatory compliance data over 19 years (1999-2017). The extent of this data set coverage makes it unique and provides a significant contribution to the literature on bank regulation and efficiency effect. For the reason that it is the only study that compiles financial market stability, volatility and financial and economic freedom variables along with bank regulation variables and bank-specific variables over 19 consecutive years.

### **3.3.5 Macroeconomic variables (Z)**

Bank resilience and stability usually have Macroeconomic conditions roots, “slow output growth, high and volatile inflation, rapid exchange rate depreciation, high real interest rates, and rapid credit expansion is associated with bank instability”, see Demirgüç-Kunt and Detragiache (2010). To control for the countries’ economic status due to the direct influence on citizens, creditors, depositors, investment and lending, TFP is also regressed over Gross Domestic Product and Consumer Price Index. Economic freedom (ECFR) and financial freedom (FnFrmd) are obtained from Miller *et al.* (2000-2017). ECFR and FnFrmd are combined indices summarising the ease to get into several types of businesses and the rule of law and corporate governance. **Financial Stability indices;** To consider the subject banks’ readiness to face any market disturbance and system stability. Banking Sector Z-score (Z) defined as the overall banking sector soundness indicator<sup>54</sup> and Market Volatility (Stock

---

<sup>54</sup> Since it is calculated on the bases of Return on Assets, and Equity to Assets ratio (capitalisation), where sd is the Standard Deviation;  $Z = (ROA + (\text{equity}/\text{assets}))/sd(ROA)$ .

prices volatility) are downloaded from Datastream and the World Bank database, respectively. Z-score might have certain limitations in assessing banks' efficiency and productivity, but it is still considered much competent because it is less affected by country-specific codes of practice in regulation and reporting like Non-Performing Loans, Interest Margins, and Capital Adequacy (Demirgüç-Kunt and Detragiache, 2010).

### 3.4 Results

**Table 3-1** presents the summary statistics of the full sample. **Panel 1** describes the mean and standard deviation of each variable, while **panel 2** gives an exposition of the median values categorised by economic development through income level. A few prominent features emerge. Bank-level variables in panel 1 illustrate a host of differences between the 93 nations showing variations in banking industry sophistication among countries. The median values suggest that the sample is positively skewed, with a small number of large banks. Furthermore, there is a high degree of full-sample heterogeneity, with values varying widely about their means according to standard deviation figures. From **panel 1** the full sample means of regulatory compliance activities (Activity Restrictions, Private Monitoring, Capital Requirements and Supervisory Power) do not show high levels of dispersion (Means respectively; 9.22, 4.35, 5.34, 10.78; St. Deviation respectively; 2.77, 1.31, 1.57, 2.46).

Furthermore, when BCP compliance is categorised over countries income, the dispersion remained minimal. This outcome is attributed to the time lag between the dates of the BCP (Demirgüç-Kunt and Detragiache, 2011) survey and current examination where banks would have had over three years to comply with BCP measures. **Panel 2** provides exciting insights into the variations of bank regulations compliance and efficiencies realisation among different economies. High-income countries appear to have fewer activities restrictions, less supervisory power and higher private monitoring compared to lower-income countries. This is likely the effect of a heavier reliance on private monitoring in high-income countries than in lower-income, in addition to the dilution of regulators' powers in high-income countries and being distorted over several regulatory agencies (Acharya *et al.*, 2009; Boyer and Kempf, 2017; Ayadi *et al.*, 2016a) while the opposite is true in the low-income economies where regulators are single agencies. However, regulatory distortion is also

reflected in the efficiency changes. Results show that, although high-income jurisdictions enjoy the positive scale and technological efficiencies compared to lower-income ones, pure technical efficiencies and total productivity change appear higher and steadier in medium-high and medium-low-income countries. Boyer and Ponce (2012) argue that the use of the two supervisory technologies by one supervisor may imply informational advantages and efficiency gains.

Furthermore, Table 3-1 shows that Economic and Financial Freedom are low in high-income countries compared to lower-income countries. This is likely attributed to the ease of establishing and conducting business that is swifter in the majority of medium low-income countries than high-income ones due to lessened corporate governance and regulations effect, especially if accompanied with the least of investor protection and during waves of privatisation and reforms following economic or financial distresses (Boubakri *et al.*, 2005).

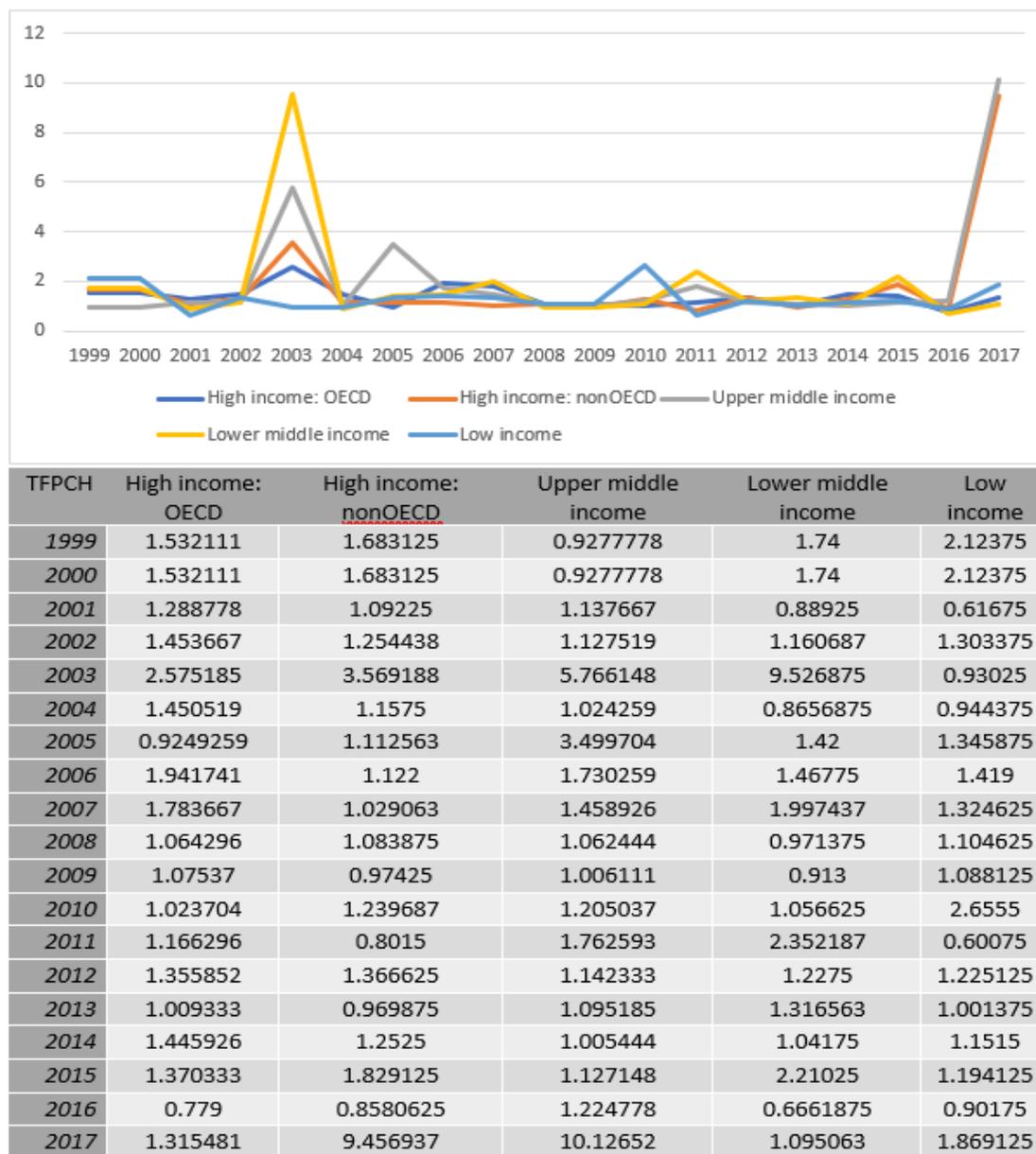
Figures 3-1 and 3-2 present the variation of the mean of Total Factor Productivity Change over the years 1999-2017 in different income levels and regions, respectively.

Table 3-1 Descriptive statistics; 2,155 banks in 94 countries and their regional and economic areas distribution.

Panel 1: Full sample summary statistics				Panel 2: Median values by Income Level				
	Mean	Median	SD	High Income non-OECD (304 Banks)	High Income OECD (513 Banks)	Upper Middle income (513 Banks)	Lower Middle Income (304 Banks)	Low Income (152 Banks)
<b>Bank level variables</b>								
<b>Inputs (Mil \$US)</b>								
Deposits and short-term funding	260,000,000	34,500,000,000	234,000,000,000	296,000,000	268,000,000	335,000,000	183,000,000	211,000,000
Overheads	3,390,000,000	31,900,000	22,800,000,000	41,700,000	36,100,000	31,400,000	26,000,000	21,200,000
Fixed Assets	647,000,000	5,690,000	5,160,000,000	5,930,000	4,740,000	6,580,000	4,970,000	5,560,000
<b>Outputs (Mil \$)</b>								
Net Loans	29,500,000,000	253,000,000	222,000,000,000	319,000,000	248,000,000	328,000,000	167,000,000	248,000,000
Non-interest income	697,000,000	5,090,000	5,700,000,000	3,140,000	5,210,000	5,480,000	2,740,000	5,220,000
<b>Bank Characteristics</b>								
Total assets (Mil \$)	5,340,000	62,000	40,400,000	60,400	68,200	51,900	65,100	56,900
Credit to Deposit	108.092	93.989	75.608	95.883	93.377	92.4292	94.334	93.057
Equity to assets	9.7577	9.3637	4.6443	10.558	7.113	9.6483	9.3869	10.9296
Return on equity	16.6819	14.8529	18.157	14.4246	14.6918	14.8087	14.9642	16.7256
Return on Assets	1.5923	1.3472	2.6332	1.3412	1.3286	1.3891	1.3173	1.345
Lerner Index	0.2687	0.2611	0.1483	0.2503	0.2702	0.2476	0.2703	0.2718
<b>Country level variables</b>								
<b>Regulatory variables</b>								
ACTRS	9.22	9	2.77	9	9	9	10	9.5
PRMONT	4.35	4	1.31	4	4	4	4	4
CAPRQ	5.34	5	1.57	5	6	5	5	6
SPOWER	10.78	11	2.46	11	11	11	11	11
<b>Efficiency Variables</b>								
EFFCH	1.194	1	0.8211	1	0.996	1	1	1
TECHCH	1.3704	1	3.505	1	1	0.995	0.9905	0.9995
PECH	1.1242	1	0.758	1	1	1	1	1
SECH	1.0895	1	0.4633	1.004	1	1	1	1
TFPCH	1.6879	1	6.5484	1	1	1	1	1
<b>Stability Variables</b>								
Regulatory Capital to Risk Weighted Assets	15.7007	15.5	4.4246	15.7	15.6	15.5	15.45	15.2
Liquid Assets to Deposits	33.5685	29.2886	18.0996	29.3465	28.3625	30.0036	30.0599	28.9693
Market Volatility	20.6235	19.2106	10.5059	19.6423	18.1112	19.2106	19.4702	19.7208
Z score	11.1742	9.1172	8.0433	9.101	9.2672	8.808	9.7466	8.3475
<b>Sector-specific and Macroeconomic variables</b>								
Concentration(5)	82.594	86.84	16.481	87.958	87.725	85.615	87.409	86.179
Economic Freedom	63.549	63.5	9.776	62.6	63.83	63.45	64.1	63.25
Financial Freedom	56.215	50	18.343	50	50	50	60	60
CPI-Inflation	93.04	95.035	30.37	92.995	95.111	94.213	95.277	95.21
GDP Growth (\$USD Mil)	577,496.20	115,000.00	1,721,454.00	120,000.00	120,000.00	100,000.00	120,000.00	100,000.00

This table describes the full sample of 2,155 banks in 94 countries that belongs to various regional and economic areas. The full sample of 94 countries and 35 banks specific and country specific variables cumulated 1,786 observations. TFP growth is decomposed into Technical Efficiency (EFFCH) (relative to CRS Technology), Technological Change (TECHCH), Pure Technical Efficiency (PECH) (relative to VRS Technology), Scale Efficiency Change (SECH), and Total Factor Productivity Change. Source: Own Calculation on DEAP Software. Although these variables are bank level calculated variables, they are presented at country level to reflect the fact of aggregating them over banks jurisdiction of ownership (country) to be part of the summary statistics. Regulatory variables are collected through survey questionnaires by countries central banks to reflect their individual approach to each of activity restrictions (ACTRS), private monitoring (PRMONT), capital requirement (CAPRQ) and supervisory powers (SPOWER). The scores collected from these surveys serve as indicator of the regulatory regime applicable to all banks in each country.

Figure 3-2 presents the variation of the mean of Total Factor Productivity Change over the years 1999-2017 in different income levels.

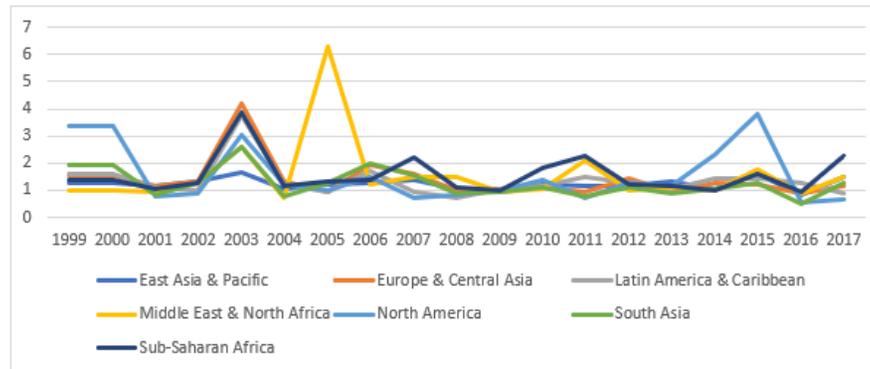


**Figure 3-2 Total Factor Productivity Change over years of Different Income Levels Countries.**

These figures show the accommodation of the dotcom bubble in the financial sector, through the adoption of several payments and transactions technologies (Pilbeam and Nagle, 2009; Owusu Kwateng,

2019). These adoptions reflect in decreasing costs of transactions and higher profits. This reflects enhanced technological and technical efficiency that are factors of the TFPCH (Kontolaimou *et al.*, 2012).

Figure 3-3 shows the variation of TFPCH over the years 1999-2017 for various regions; where TFPCH appear to be homogeneous among regions across years, and financial/economic waves. However, there are distinct variations where few regions banking sectors have outperformed other regions, namely, MENA countries between 2004 and 2006 along with petrodollars funded financial infrastructure. Notably, during the 2008-2011 crisis, MENA and other low-income regions have had positive, or higher, TFPCH than other advanced regions. This performance is mainly attributed to the level of connectedness of these economies to the financial markets in the US and Europe where the crisis was hardest and cascaded through all financial institutions' types (Kahle and Stulz, 2013).



TFPCH	East Asia & Pacific	Europe & Central Asia	Latin America & Caribbean	Middle East & North Africa	North America	South Asia	Sub-Saharan Africa
1999	1.252909	1.542588	1.582	0.9864615	3.363	1.9106	1.403529
2000	1.252909	1.542588	1.582	0.9864615	3.363	1.9106	1.403529
2001	1.168	1.184971	1.092	0.9459231	0.8015	0.8192	1.053824
2002	1.349364	1.334559	1.006917	1.272769	0.8685	1.2524	1.289118
2003	1.646545	4.206706	3.737833	2.582077	3.061	26.1446	3.869941
2004	1.028727	1.334882	1.239417	0.7427692	1.1985	0.755	1.137765
2005	1.199091	0.9543235	0.9631667	6.310077	1.0215	1.2914	1.354529
2006	1.3	1.909	1.709417	1.208	1.5175	1.9622	1.391941
2007	1.373727	1.578765	0.9195833	1.511154	0.746	1.5508	2.226824
2008	1.073636	1.017941	0.74575	1.476846	0.844	0.8956	1.082882
2009	0.9546364	1.042735	1.057917	0.9662308	1.023	0.9392	1.008765
2010	1.225909	1.087059	1.179417	1.069154	1.356	1.1124	1.846471
2011	1.140727	0.9580588	1.5145	2.101385	0.7465	0.7534	2.263
2012	1.146364	1.435441	1.277583	0.9900769	1.2815	1.127	1.231941
2013	1.328727	0.9682941	1.059667	1.114308	1.1655	0.9064	1.165471
2014	1.039909	1.279235	1.436833	0.9820769	2.3355	1.0606	1.011235
2015	1.580727	1.226118	1.46325	1.791615	3.835	1.2664	1.628647
2016	0.8243636	0.9012353	1.246917	0.86	0.555	0.5204	0.9493529
2017	1.495091	11.76212	0.89675	1.493769	0.673	1.2816	2.260412

*Figure 3-3 Total Factor Productivity Change over years of Different Regions.*

### 3.4.1 Regulation, efficiency and TFP change

Regression<sup>55</sup> results (Tables 3-2 and 3-3) suggest that **bank size** is significantly positively associated with TFP growth. Results also show that bank size (Log of total assets – **Lntas2**) has a positive coefficient when regressed against market structure controls of concentration, foreign to domestic credit and regulation. This is intuitive since banks are more likely to benefit from economies of scale when becoming large (Delis *et al.*, 2011a) through national M&As, international currencies portfolios and transactions. However, this does not apply to banks from the developed oil-exporting countries which have experienced geographical, and asset expansions and consequently have not necessarily witnessed productivity growth. The main reason for the negative association between bank size and concentration and total productivity growth is competition. Competition exerts a "push force" for institutions to diversify products and expand both locally and internationally. This reasoning coincides with AL-Muharrami *et al.* (2006) and Ariss (2009) findings when studying competition conditions in MENA Banks. It is a justification of why banks in developing economies have ongoing plans to benefit from economies of scale, which is backed by this study's TFP decomposition showing relatively positive and improving scale efficiency.

---

<sup>55</sup> Because TFP change is a proportion variable in nature, and because regulatory variables and some of the economic variables are constructed based on dummy variables (considered categorical) two regression methods are utilised. Namely, 1) Poisson with fixed effects for where OLS for this regression is called LSDV (least-squares dummy variables). Assuming independent variables as non-stochastic, LSDV is unbiased, consistent, and linear efficient (BLUE) (Josh, 1995). This model allows for heterogeneity or individuality among various data groups (clusters, panel variables=countries) by allowing to have independent cluster-own intercept, however intercept does not vary over time (Kelton and Yang, 2008). 2) GLM with log links; refers to conventional linear regression models for a continuous response variable given continuous and/or categorical predictors. The link function specifies the link between random and systematic components (Capon *et al.*, 1990). It says how the expected value of the response relates to the linear predictor of explanatory variables. There are several advantages of the GLM over OLS regressions (J.S. Ramalho and da Silva, 2009; Hilbe, 2011); a) We do not need to transform the response Y to have a normal distribution, and b) models are fitted via Maximum Likelihood estimation; thus optimal properties of the estimators, to count few.

**Table 3-2 Truncated Regression of Total Factor Productivity over Regulatory, efficiency, firm and market variables.**

TFPCH	Coefficient	P Value	
<i>CAPRQ</i>	-0.054376	0.610	
<i>PRMONT</i>	-0.1244678	0.345	
<i>ACTRS</i>	0.2248143	0.000	
<i>SPOWER</i>	-0.1002544	0.135	
<i>Concentration(5)</i>	-0.0017461	0.866	
<i>Lerner Index</i>	-4.419425	0.000	
<i>GDP Growth (\$ US Mil)</i>	-0.0000000186	0.854	
<i>Market Volatility</i>	0.0422381	0.008	
<i>Economic Freedom</i>	-0.0540374	0.050	
<i>Financial Freedom</i>	0.0123733	0.402	
<i>Z score</i>	0.0346942	0.103	
<i>CPI - Inflation</i>	0.0102847	0.071	
<i>cons</i>	3.40526	0.089	
<b>Source</b>	<b>SS</b>	<b>df</b>	<b>MS</b>
<b>Model</b>	2052.98811	12	171.082343
<b>Residual</b>	74481.2621	1,757	42.3911566
<b>Total</b>	76534.2502	1,769	43.2641324
<b>Number of obs</b>	1,770		
<b>F(12, 1757)</b>	4.04		
<b>Prob &gt; F</b>	0		
<b>R-squared</b>	0.0268		
<b>Adj R-squared</b>	0.0202		
<b>Root MSE</b>	6.5108		

*This table presents that Truncated Regression; Log Likelihood of Total Factor Productivity over Regulatory variables and Bank proxies of efficiency and Size and Market Power. \*\* and \* denotes significance levels of 1% and 5% consecutively (Confidence levels of 99% and 95%). Regulatory variables are collected through survey questionnaires by countries central banks to reflect their individual approach to each of activity restrictions (ACTRS), private monitoring (PRMONT), capital requirement (CAPRQ) and supervisory powers (SPOWER). The scores collected from these surveys serve as indicator of the regulatory regime applicable to all banks in each country. Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, mark-up). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. Market Volatility is the indicator of the overall soundness of the banking sector. It is calculated as  $(ROA\% + (equity/assets))/sd(ROA\%)$ . GDP is the Real GDP growth and CPI to represent inflation (Source: World Bank, 2017).*

**Capital requirements - CAPRQ** Although, under the regulatory paradigm, increased capital provides more confidence to clients and customers, leading to an increase in spending and investments, regressions yield a negative but not significant association with TFP. This association confirms the pro-cyclical effect of capital requirements, similarly to what was reported by Alfon *et*

al. (2004) in the UK, Ayuso *et al.* (2004) in Spain, Lindquist (2004) in Norway, and (Stolz and Wedow, 2011) in Germany. This result resonates the growing literature on the negative impact of increased capital buffers (Basel 3) and their impact on available funds for lending that forms banks' source of interest income.

**Table 3-3 Total factor productivity change, market power and bank efficiencies.**

<i>Generalised Linear Model</i>				
	<b>No. of Obs</b>	1770	<b>Scale Parameter</b>	38.01722
<b>Maximum Likelihood</b>	<b>Residual Df</b>	1766	<b>Link function:</b>	$g(u)=\ln(u)\{\text{Log}\}$
<b>Deviance</b>	66948.32663	(1/df) Deviance	37.90958	
<b>Pearson</b>	66948.32663	(1/df) Pearson	37.90958	
<b>Log pseudolikelihood</b>	-5726.674459	<b>Variance function:</b>	$V(u)=1$	
<b>Gaussian, Log Link</b>	<b>TFPCH</b>		<b>Coef.</b>	
		CAPRQ	-0.1306171	
		PRMONT	-0.6630489***	
		ACTRS	1.097247***	
		SPOWER	-0.2632406***	
		Economic Freedom	-0.088079	
		Financial Freedom	0.0533063	
		Concentration(5)	-0.052275***	
		Lerner Index	-6.688768***	
		_cons	0.1484265	
<b>Poisson, Log Link</b>	Log pseudolikelihood	-4297.924328	<b>(1/df) Deviance</b>	<b>2.81</b>
	<b>Deviance</b>	<b>4970.52801</b>	<b>(1/df) Pearson</b>	<b>10.51959</b>
	<b>Pearson</b>	<b>18577.59037</b>	<b>BIC</b>	<b>-8236.918</b>
			<b>AIC</b>	<b>4.860931</b>
		<b>TFPCH</b>	CAPRQ	-0.0393738
			PRMONT	-0.0992684
			ACTRS	0.1270106***
			SPOWER	-0.0470102
			Economic Freedom	-0.0286679*
			Financial Freedom	0.0062831
			Concentration(5)	-0.0020732
			Lerner Index	-1.834859***
			_cons	2.507637***

*This table shows two different regression methods of the same model of TFPCH over market conditions. Total factor productivity change regression, using Generalised Linear Model regression, and Market Power Index Behaviour among different models using Mixed effect Log Likelihood and Gaussian Parametric Generalised Linear model as efficiencies and TFP and Lerner's Index are calculated in a parametric technique while Regulatory variables are not. The regression optimises on the bases of Gaussian and Poisson maximum likelihood and the standard errors are log linked and adjusted to reflect clusters of income groups differences. The literature (finance and econometrics) suggest Poisson and Gaussian for when dependant variables are estimations, ratios or decimals. See footnote no.53 on page 179 for detailed discussion on those methods. Economic and Financial Freedom are Proxies for the financial sector freedom and the overall level of economic freedom. They are composite indices that are calculated by considering: business freedom, trade freedom, fiscal freedom, government spending, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, labour freedom (Source: Heritage Foundation). \*\* and \* denotes significance levels of 1% and 5% consecutively (Confidence levels of 99% and 95%).*

Cross regions analysis (**Table 3-4**) shows that South Asia, Sub-Saharan Africa and the MENA countries confirm a negative impact of CAPRQ on productivity change. However, banks in North America and Latin America and the Caribbean do grow productivity with higher capital requirements. This is reversed to the level of efficiency of these markets, especially when considering TFPCH concerning the level Income (GNI per Capita) (**Table 3-5**). For the reason that banks operating in countries imposing high capital requirements have reputational and confidence rewards that outweigh the losses from capital reserves (Fonseca and González, 2010).

**Supervisory power – SPOWER** shows high significance across all models (**Tables 3-4& 3-5**). Such results contrast with Delis *et al.* (2011a), who argue that, for transition economies, increasing capital requirements and supervisory powers do not influence productivity and its growth. Official supervisory powers by regulators on banks drive productivity growth in all regions except Europe and Central Asia, where SPOWER and TFPCH are negatively associated with up to 10 times stronger influence. The result is justified by analysing this association over the level of income. High-income countries exhibit the only negative high magnitude impact of SPOWER on TFPCH among other income levels (Table 3-5). This outcome emphasises the preference of banks to be free from official supervisory power that enables their diversification and risk-taking initiatives, which usually drives returns and value. **Activity restrictions – ACTRS**, such as restrictions on real estate, insurance, and securities businesses, are negatively associated with productivity change in all Income level groups except banks in High-Income countries (Table 3-5). Results reflect the fact that most of the sample's economies thrive, expanding towards the newest financial services and innovations. Results are consistent with Barth *et al.* (2004), who suggest that fewer restrictions might provide additional profit opportunities. However, this could also signal banks' efforts to gain a too-big-to-fail status as a guarantee and insurance in times of economic slowdown or crisis (Fonseca and González, 2010). Such efforts are standard practice in developed (High Income) countries, which is why ACTRS

positively influence productivity growth in this group and in Europe, Central Asia, Latin and North America (Table 3-4) as risk-averse regions especially following the 2007 crisis.

Table 3-4 Total Factor Productivity change with Regulatory, Regional distribution and Macro - Environment Variables.

TFPCH in:	East Asia and Pacific	Europe & Central Asia	Latin America & Caribbean	Middle East & North Africa	North America	South Asia	Sub-Saharan Africa
<i>Prob&gt;F</i>	0.0001	0.0001	0.0008	0.0001	0.0003	0.0001	0.0002
<i>R-Squared</i>	0.0482	0.0695	0.0892	0.0443	0.6216	0.0249	0.0694
<i>No. of Obs</i>	9,863	28,435	8,422	12,502	1,866	4,275	18,682
<i>CAPRQ</i>	-0.0124481	0.0061944	0.0274179***	-0.1550421***	0.0977562**	-0.1125271**	-0.0710285***
<i>ACTRS</i>	-0.0204827***	0.6640191***	0.0289661***	-0.0090338**	0.1568396***	0.0969313*	0.0383555***
<i>PRMONT</i>	-0.0600068***	-0.8276725***	-0.0407646***	-0.1419552***	-0.8726402***	-0.0154476	-0.0207647**
<i>SPOWER</i>	0.055532***	-0.5026279***	0.0243067***	0.0415967***	0.0935077***	0.0614292***	0.0694784***
<i>Financial Freedom</i>	-0.0004684	-0.0194631***	0.0017352***	-0.0257563***	-0.0043653**	0.0180329***	-0.0009033
<i>Concentration(5)</i>	0.0087628***	-0.0859154***	0.0148842***	0.0042909***	0.053115***	0.0153545***	0.0053048***
<i>Lerner Index</i>	-0.3310266***	-4.648467***	-0.0880018	-2.70189***	-4.925682***	-1.030027**	-3.755018***
<i>Market Volatility</i>	-0.0019507	0.082255***	0.0166009***	0.0066668**	0.0918879***	0.0230578*	-0.0226273***
<i>Z score</i>	0.0027075*	0.0687584***	-0.0084884**	0.002415	-0.0181208***	0.0385487***	0.0217775***
<i>CPI-Inflation</i>	-0.0013101***	0.0230227***	0.0107606***	0.0042222***	0.0567945***	0.000253	0.0008435
<i>GDP Growth (\$USD Mil)</i>	0.000000082***	-0.000000357***	0.000000081***	0.0000000711***	0.000000052***	0.000000019	-0.0000000416***
<i>Equity/T. Assets Ratio</i>	-0.0137372***	0.0258656***	0.0495891***	-0.0636119***	0.1044632***	-0.0643084***	-0.0226274***
<i>ROA (%)</i>	-0.0024448	-0.0842105***	-0.0679872***	0.032682***	-0.2416159***	-0.3290062***	-0.0130655***
<i>ROE (%)</i>	-0.0009276	0.0183066***	0.0082205***	-0.0237556***	0.0489663***	0.0379495***	0.004642**
<i>cons</i>	0.8942904	9.685678	-2.302562	4.803142	-8.736987	-2.014146	1.806957

This table evidence the association of Total Factor Productivity change with Regulatory and Macro - Environment Variables. A robust regression by Region, with bias correction term of  $1/(1-h)^2$  best for homoskedasticity is conducted. Results are Relatively Identical under Bias terms  $1/(1-h)$  and similar Under OLS regression. Frequency weight of Countries is implemented. Regulatory variables are collected through survey questionnaires by countries central banks to reflect their individual approach to each of activity restrictions (ACTRS), private monitoring (PRMONT), capital requirement (CAPRQ) and supervisory powers (SPOWER). Z score is the Banking Sector stock price volatility; the average of the 360-day volatility of the national stock market index. Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, mark-up). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. Market Volatility is the indicator of the overall soundness of the banking sector. It is calculated as  $(ROA\% + (equity/assets))/sd(ROA\%)$ . GDP is the Real GDP growth and CPI to represent inflation (Source: World Bank, 2017). \*, \*\*, \*\*\* denotes the level of significance at confidence levels of 90%, 95% and 99% respectively.

Table 3-5 Total Factor Productivity change with Regulatory variables, income level segregation and Macro - Environment Variables.

TFPCH in:	High Income	Low Income	Lower Middle Income	Upper Middle Income
<i>Prob&gt;F</i>	0.0003	0.0012	0.0234	0.0324
<i>No. of Obs</i>	36,037	7,348	14,752	25,908
<i>CAPRQ</i>	0.0801142***	0.1060539***	-0.1254284***	-0.146406***
<i>ACTRS</i>	0.5618506***	-0.0098752	-0.0252869***	-0.0505968***
<i>PRMONT</i>	-0.6282729***	-0.1752638***	-0.0132055	-0.0667945***
<i>SPOWER</i>	-0.4108346***	0.24821***	0.0699386***	0.0252005***
<i>Financial Freedom</i>	-0.0198732***	-0.0394193***	-0.0027844***	0.0023363***
<i>Concentration(5)</i>	-0.0476908***	0.0230605***	0.0075428***	0.0022277***
<i>Lerner Index</i>	-6.06324***	-5.640942***	0.7492304***	-0.7880182***
<i>Market Volatility</i>	0.0712176***	0.0107521**	-0.0200437***	0.0002213
<i>Z-Score</i>	0.0739795***	0.0135172***	-0.0087965***	-0.0054071***
<i>CPI-Inflation</i>	0.0158714***	0.0047633***	-0.0017331***	0.0013285***
<i>GDP Growth (\$USD Mil)</i>	-0.000000258***	-0.0000000555***	0.0000000305***	0.000000149***
<i>Equity/T. Assets Ratio</i>	-0.0202285***	-0.0543367*	0.0079746***	-0.0175084***
<i>ROA (%)</i>	-0.0687841***	-0.2089763***	-0.0045999***	-0.0137855***
<i>ROE (%)</i>	0.0090713***	-0.0301204***	-0.0106073***	0.0026577***
<i>cons</i>	6.823406	1.735721	1.699725	2.470435

This table shows the association of Total Factor Productivity change with Regulatory and Macro - Environment Variables. A robust regression by Countries Income Level, with bias correction term of  $1/(1-h)^2$  best for homoskedasticity is conducted. Results are Relatively Identical under Bias terms  $1/(1-h)$  and similar Under OLS regression. Frequency weight of Countries is implemented. \*, \*\*, \*\*\* denotes the level of significance at confidence levels of 90%, 95% and 99% respectively.

**Private Monitoring – PRMONT** Shows negative association with productivity growth in all models, all regions and all income levels groups (Tables 3-4 & 3-5). It could be an indication of the cost of developing and implementing private monitoring practices and how these costs might affect profitability and outputs. This should not mean that banks are not required to enhance private monitoring and incorporate it at a full scale in all industries. Instead, it explains the existing situation in several financial systems that simulate the political system they operate in and are bureaucratic and volatile in several cases. Such results lead to proposing the promotion of further corporate governance and establishing mechanisms that monitor and award institutions for systems and personnel standardisation self-auditing (Shehzad *et al.*, 2010).

### **3.4.2 TFP efficiencies change, regulations and market factors**

When decomposing TFP growth several and conducting Robust regression with bias correction term of  $1/(1-h)^2$  (similar results with  $1/(1-h)$ ) that is best for homoskedasticity, interesting relationships emerge. **Table 3-6** (and **table** in the appendix 3.6.2 for Income level Categorisation) demonstrate that capital requirements appear to create negative efficiency change (EFFCH), pure technical efficiency change (PECH) and scale efficiency change (SECH), but positive technological change (TECHCH) in high-income countries. However, CAPRQ drives scale efficiency in low and middle lower-income countries. It reflects the general concept that heavily regulated banks in these countries are the larger ones that can capitalise on scale and scope but are also more noticeable to regulators, hence prone to more regulations. Activity restrictions appear to positively and actively drive technological change in high-income countries. A resolution that is theoretically and technically true because banks have innovated towards securitisation as a response to restrictions on branching before the 2007 crisis, along with innovations in the real estate sector. Private monitoring and

supervisory power have a similar effect on technological change, however a positive effect on pure efficiency due to the costs associated with their adoption.

**Table 3-6 Efficiencies association with Regulatory and Macro-Environment variables categorised over Countries.**

<i>Efficiencies</i>	<b>EFFCH</b>	<b>TECHCH</b>	<b>PECH</b>	<b>SECH</b>
<i>Obs</i>	84,045	84,045	84,045	84,045
<i>Parms</i>	15	15	15	15
<i>RMSE</i>	0.8332515	3.542737	0.8210089	0.4828239
<i>R-squared</i>	0.0598	0.028	0.0734	0.034
<i>F</i>	381.9961	172.6522	475.1145	211.115
<i>P&gt;F</i>	0	0	0	0
<i>CAPRQ</i>	-0.0584364***	0.0119948	-0.0630663***	-0.0150025***
<i>ACTRS</i>	-0.0253861***	0.1565718***	-0.0335865***	0.0051061***
<i>PRMONT</i>	0.0036832	-0.1911179***	0.0601771***	-0.0563874***
<i>SPOWER</i>	0.0066167***	-0.0737626***	0.0245749***	-0.0059834***
<i>Financial Freedom</i>	0.0005345***	-0.0059502***	-0.0010325***	0.0009776***
<i>Concentration(5)</i>	-0.0018888***	-0.0039793***	0.0015173***	-0.0026187***
<i>Lerner Index</i>	-0.3250326***	-1.817922***	0.0713533***	-0.3755752***
<i>Market Volatility</i>	-0.0010711***	0.0156774***	-0.0015974***	0.0004679***
<i>Z-Score</i>	0.005186***	0.008984***	-0.0012229***	0.0045164***
<i>CPI-Inflation</i>	0.0006141***	0.0050359***	0.0006075***	0.0001987***
<i>GDP Growth (\$USD Mil)</i>	0.0000000908***	-0.0000000587***	0.00000011***	-0.000000000188
<i>Equity/T. Assets Ratio</i>	-0.0069119***	-0.013819***	-0.0057624***	0.002556***
<i>ROA (%)</i>	-0.0072469***	0.0364647***	-0.003271**	-0.0077687***
<i>ROE (%)</i>	0.0021384***	-0.0034636***	-0.0002024	0.0027126***
<i>cons</i>	1.788062***	1.902219***	1.185681***	1.556809***

*This table presents the Efficiencies association with Regulatory and Macro-Environment variables categorised over Countries as frequency weights using Robust regression with bias correction term of  $1/(1-h)^2$  that is best for homoskedasticity. Results are Relatively Identical under Bias terms  $1/(1-h)$  and similar Under OLS regression. Frequency weight of Countries is implemented. \*, \*\*, \*\*\* denotes the level of significance at confidence levels of 90%, 95% and 99% respectively. Income Level Categorisation; Low-income: GNI per capita= \$995 or less; lower middle-income: GNI per capita between \$996 and \$3,895; upper middle-income GNI per capita between \$3,896 and \$12,055; high-income: GNI per capita of \$12,055 or more.*

In contrast, in low-income countries, official supervisory power actively drives technological change (Drake *et al.*, 2006; Casu *et al.*, 2016). This explains the situation where technological change is brought to the sector by the supervisory agencies themselves to enhance transparency and governance. Similar results are witnessed in middle-lower- and middle-upper- income countries.

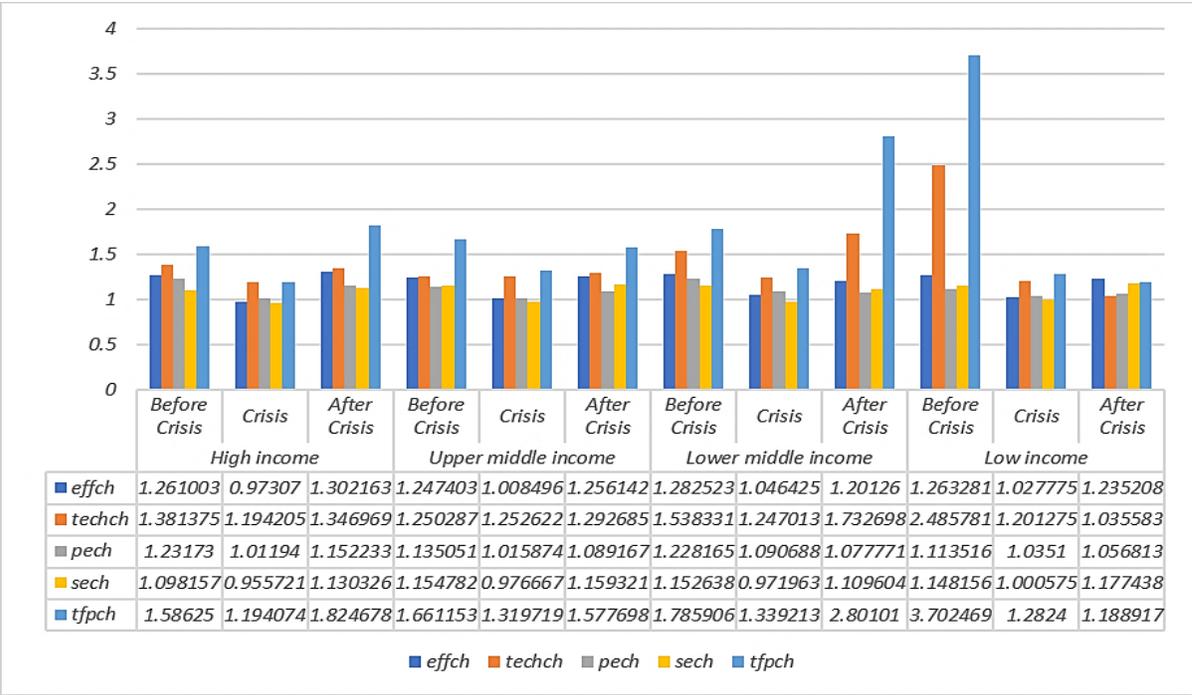
Furthermore, Financial freedom enables scale efficiency change while it impedes technological and pure technical efficiency changes. Such results indirectly hint at the diversification paradigm in the financial sector; encouraging focusing bank activity during growth to enable scaling up output

and economies but not adopting new technologies or diversifying income resources in a way that require technological change. A practice that is well documented in the merger literature that explores the impact of diversification strategies on bank performance, although the divergence in results. (Curi *et al.*, 2015; Kevork *et al.*, 2017). Concentration (largest five banks by assets) and Lerner's index, which is a measure of market power both affect all efficiencies negatively. However, Lerner's index appears to be a much clearer measure than concentration. It shows that higher market powers, and more concentrated markets, adversely affect banks efficiencies despite the general attitude that it decreases its riskiness (Shehzad *et al.*, 2010). This is a relevant argument resonating post-2007 crisis regulations, particularly against the over-expansion of financial institutions and reaching a too-big-to-discipline status with the motivation of risk aversion excuse.

Market volatility and Z-score appear to both drive technological change and scale efficiency growth, but negatively impact pure technical efficiency. Such results could be a simulation of banks activities attempting to increase returns through diversification that increases its Z-score, as an index of systematic risk, and then propagated into market volatility as a composite index of risk. For the reason that, diversifying activities or geographies are directly related to innovation, technological change and scale efficiency change. Improvements in pure technical efficiency appear to be at the cost of equity value and profitability. This result is seen in the negative association of PECH with each of equity to assets ratio, ROA and ROE. However, the profitability of ROA accompanies and enable technological change but not scale efficiency and overall efficiency (X-efficiency). Results that reflect the episode where banks are profitable and can implement technological change, but are not successful in generating efficiencies, nor benefiting from economies of scale or scope. This is due to several other environmental factors like culture, legal and language differences (Bonin *et al.*, 2005; Halkos and Tzeremes, 2011; Kontolaimou *et al.*, 2012). Inflation as in consumer price index

representing economic growth appears to drive all bank efficiencies. However, GDP is not enough signal on technological and scale efficiencies change in banks.

Overall, banks total factor productivity has deteriorated during the 2008-2011 crisis. Chart 3.I below shows that all banks were able to recover productivity growth level back to pre-crisis levels, except banks operating in low-income countries. Mainly because of technological change remained at the crisis levels.



**Figure 3-4 Productivity Growth and Efficiencies, Crisis and Country's Income Level.**

A realisation that echoes banks incapacity to implement technological change due to funds draining during crises and late recovering policy and actions by regulators and financial institutions. The 2008-2011 financial crisis appears to have affected bank regulation influence on productivity growth. Although capital requirement continues to be hindering productivity before and during the crisis, the influence (magnitude) has doubled during the crisis year. Which most probably justifies banks higher need for funds during distress and their preference to utilise in investment and interest-

earning activities rather in reserves and buffers. However, the effect of capital requirements on productivity growth flips to become significantly positive after crisis (2012 onward). The reason is the lessons learned from the crisis and to the investor's confidence in well regulated (reserved/hedged) banks (Deli and Hasan, 2017b; Fonseca and González, 2010). A similar perception is witnessed in activity restrictions relationship with productivity growth. **Table 3-7**, below, extend this evidence over to High-Income countries banks. However, the opposite is true for lower- and middle-income countries. It is grounded in two main aspects; **a**) the nature of the 2007 crisis and the countries most affected by it are the high-income countries, and **b**) High-income countries tend to be the developed ones with more efficient markets than other income levels jurisdictions. Hence the speed of adaptation to regulatory and self-corrective measures is faster. Following the financial crisis, concentration and market power (Lerner's Index) become increasingly perceived as productivity deteriorating factors in the banking sector. Representing the paradigm of compliance and investors/clients trust in compliant banks, which would drive investments, transactions and banks profitability. Inflation is no longer a significant (negative) factor affecting bank productivity after the 2007 crisis (Athanasoglou *et al.*, 2014; Ayadi *et al.*, 2016a). Productivity growth appears to have switched from being a cost on equity (-ve ROE) but driven by profits (+ve ROA) before the crisis to become highly costly (-ve ROA) after the crisis.

Table 3-7 Financial Institutions' efficiencies association with Regulatory and Macro-Environment variables around the 2008-2011 financial crisis.

Efficiencies	High Income				Low Income			
	EFFCH	TECHCH	PECH	SECH	EFFCH	TECHCH	PECH	SECH
Obs	36,037	36,037	36,037	36,037	7,348	7,348	7,348	7,348
Parms	15	15	15	15	15	15	15	15
RMSE	0.8227078	5.082041	0.8648172	0.4862833	0.7008946	1.714519	0.5714704	0.424376
R-squared	0.0949	0.0681	0.0988	0.0502	0.0931	0.0604	0.1664	0.1448
F	269.8647	187.896	282.1821	135.8557	53.75573	33.65723	104.537	88.6832
P>F	0.0021	0.00325	0.00262	0.0482	0.00265	0.0385	0.0326	0.0261
CAPRQ	-0.0697601***	0.1061839***	-0.0810998***	-0.0133809***	-0.0033928	0.0200942	-0.0228435***	0.0078634**
ACTRS	-0.0087425***	0.3539783***	-0.027616***	0.007041***	0.0122408***	-0.0214678**	0.0380562***	-0.0153651***
PRMONT	-0.0161775***	-0.3113438***	0.0427563***	-0.0631097***	-0.0187725**	-0.0465049**	0.028296***	-0.0318208***
SPOWER	0.0119129***	-0.2170182***	0.0270795***	0.0001675	-0.0564532***	0.1325492***	-0.0207595***	-0.0267246***
Financial Freedom	0.0010209***	-0.0121449***	-0.0008149***	0.001451***	-0.001501***	-0.0088282***	-0.0039211***	0.0015857***
Concentration (5)	-0.0018062***	-0.013931***	0.0024646***	-0.003452***	-0.0012425**	0.0061663***	-0.0051259***	0.0038196***
Lerner Index	-0.4087321***	-3.545247***	0.0155221	-0.4674596***	-0.455474***	-1.677718***	-0.3915213***	-0.0696939
Market Volatility	0.0008455*	0.0441159***	0.0015141***	0.0006436**	-0.0047932***	-0.0040143*	-0.0127983***	0.0067355***
Z-Score	0.0097251***	0.0307628***	0.0014172**	0.0060104***	-0.0024025*	0.0087009***	-0.0057922***	-0.0006107
CPI-Inflation	0.0006265***	0.0106837***	0.0004259***	0.000667***	0.0002748	-0.0000348	-0.0002667	0.0009249***
GDP Growth (SUSD Mil)	0.000000108***	-0.000000178***	0.000000134***	-0.0000000251	0.0000000192***	-0.000000048***	-0.0000000603	0.0000000256***
Equity/T. Assets Ratio	-0.0199537***	0.0018007	-0.0112624***	-0.0061903***	0.013106***	-0.025087***	0.0050399***	0.0151059***
ROA (%)	-0.020588***	0.0230595	-0.0171895***	-0.005245***	0.0127859	-0.101926***	-0.0327815***	0.0512377***
ROE (%)	0.0030529***	-0.0015925	0.0009794**	0.0017239***	-0.0093401***	-0.0037619*	-0.0063498***	-0.0054022***
cons	1.746427	2.037119	1.179797	1.594889	2.175499	1.062339	2.174642	0.8650418
Efficiencies	Middle Lower Income				Middle Upper Income			
	EFFCH	TECHCH	PECH	SECH	EFFCH	TECHCH	PECH	SECH
Obs	14,752	14,752	14,752	14,752	25,908	25,908	25,908	25,908
Parms	15	15	15	15	15	15	15	15
RMSE	0.6528808	1.246564	0.5968163	0.4128381	0.9116245	1.106603	0.8633545	0.5059234
R-squared	0.1967	0.0627	0.3174	0.0561	0.0727	0.1078	0.0601	0.0656
F	257.6768	70.45822	489.4136	62.52546	145.0248	223.4463	118.1649	129.787
P>F	0.0021	0.00325	0.0425	0.0214	0.0325	0.0032	0.0321	0.0145
CAPRQ	-0.0485309***	-0.0210836***	-0.0463096***	0.0066282**	-0.0606559***	-0.1619709***	-0.0588996***	-0.0243228***
ACTRS	0.0063242***	-0.0158136***	-0.0012726	0.0082694***	-0.0632572***	-0.0018156	-0.0683688***	0.00833***
PRMONT	0.081184***	-0.1323214***	0.1199157***	-0.0470507***	-0.022171***	-0.0589813***	0.0322297***	-0.0538313***
SPOWER	0.0040266*	0.0350106***	0.0180994***	-0.0143455***	0.013476***	0.017375***	0.0286354***	-0.0041897***
Financial Freedom	-0.0012922***	0.0015357**	-0.0000763	-0.0018862***	0.0026436***	-0.0009918**	0.0005893*	0.0015746***
Concentration (5)	0.0035059***	0.005064***	0.0051021***	-0.0016824***	-0.0051691***	0.0068056***	-0.0010556***	-0.0031523***
Lerner Index	0.4400164***	0.1292094	0.7024908***	-0.301678***	-0.6001344***	-0.5396479***	-0.2273028***	-0.2612827***
Market Volatility	-0.005117***	-0.013601***	-0.0041592***	-0.0015977***	0.0020122***	-0.0022028***	0.000623	0.0006575**
Z-Score	0.0061957***	-0.0150797***	0.0011734	0.0046753***	0.0015753*	-0.0097337***	-0.0029232***	0.0037277***
CPI-Inflation	-0.0005183**	-0.0003934	0.0005924***	-0.0008619***	0.0015413***	0.0011173***	0.0011505***	-0.0000827
GDP Growth (SUSD Mil)	0.00000012***	-0.0000000231***	0.000000181***	-0.0000000187***	0.0000000182***	0.000000176***	-0.00000000835	0.0000000118***
Equity/T. Assets Ratio	0.0214817***	-0.0229368***	0.0170734***	0.0081329***	-0.0049617***	-0.0172285***	-0.0103893***	0.008321***
ROA (%)	-0.0083184***	0.0031126	-0.0107374***	0.0004101	-0.0229346***	0.018833***	0.0078202**	-0.0502953***
ROE (%)	0.004776***	-0.009738***	0.0039364***	0.0023062***	0.0048447***	-0.0043023***	-0.0005044	0.0074329***
cons	0.3380056	2.09689	-0.3036156	1.61225	2.336186	1.934271	1.796118	1.492529

This table shows efficiencies association with Regulatory and Macro-Environment variables categorised over Countries as frequency weights and Income levels categories using Robust regression with bias correction term of  $1/(1-h)^2$  that is best for homoskedasticity. Regulatory variables are collected through survey questionnaires by countries central banks to reflect their individual approach to each of activity restrictions (ACTRS), private monitoring (PRMONT), capital requirement (CAPRQ) and supervisory powers (SPOWER). Z-score is the Banking Sector stock price volatility; the average of the 360-day volatility of the national stock market index. Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, mark-up). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. Market Volatility is the indicator of the overall soundness of the banking sector. It is calculated as  $(ROA + (equity/assets))/\sqrt{ROA}$ . GDP is the Real GDP growth and CPI to represent inflation (Source: World Bank, 2017). Results are Relatively Identical under Bias terms  $1/(1-h)$  and similar Under OLS regression. Frequency weight of Countries is implemented. Low-income: GNI per capita= \$995 or less; lower middle-income: GNI per capita between \$996 and \$3,895; upper middle-income GNI per capita between \$3,896 and \$12,055; high-income: GNI per capita of \$12,055 or more. \*, \*\*, \*\*\* denotes the level of significance at confidence levels of 90%, 95% and 99% respectively.

### **3.5 Conclusion**

Following the recent financial crisis (2008-2011), several regulatory reforms have been proposed, and several others have been in implementation. Despite the emphasis in banking literature on the regulation, stress, deregulation and re-regulation cycles, it is still inconclusive of how these regulations affect bank performance and productivity. Some argue that tighter restrictions on bank activities are negatively associated with bank efficiency (Deli and Hasan, 2017b), while greater capital regulation is marginally and positively associated with bank efficiency (Barth *et al.*, 2013b). A strand of literature argues that different bank ownership structures react with different speeds to the change of the regulatory environment (Leightner and Lovell, 1998; Isik and Hassan, 2003), while another strand of the literature shows that ownership structure is neutral in terms of productivity growth. An important strand of literature questions the necessity of bank regulation and if its effect is diluted in regulatory arbitrage, where some institutions take advantage of multiple regulatory authorities at national and international levels (Boyer and Kempf, 2017).

Our results emphasise the negative impact of high capital buffers (Basel 3) and their impact on available funds for lending that forms banks' source of interest income. However, there exist positive associations in few economies where high capital requirements have reputational and confidence rewards that outweigh the losses from capital reserves like in North and Latin American countries. Official supervisory powers by regulators on banks drive productivity growth in all regions except Europe and Central Asia. Activity restrictions on real estate, insurance, and securities businesses, are negatively associated with productivity change in all Income level groups but High Income. Furthermore, Private Monitoring negatively influences productivity growth in all models, all regions and all income levels, groups. Results that lead to proposing the promotion of further corporate

governance and establishing mechanisms that monitor and award institutions for systems and personnel standardisation self-auditing (Shehzad *et al.*, 2010).

Furthermore, market volatility and Z-score appear to both drive technological change and scale efficiency growth, but negatively impact pure technical efficiency. Financial freedom enables scale efficiency change, while it impedes technological and pure technical efficiency changes. However, Concentration and market power affect all efficiencies negatively. Improvements in pure technical efficiency appear to be at the cost of equity value and profitability. However, ROA appears to accompany and enable technological change but not scale efficiency and overall efficiency.

The above results appear robust to a variety of model specifications that control for various country-specific characteristics and alternative estimation approaches. An outcome that allows us to interpolate other factors affecting financial institutions' productivity and sustainability. Banks, scheduled to implement several regulatory reforms like Basel III (2013) along with current updates of the ring-fencing, will have to consider the following factors to be prepared for productivity growth;

- **Operational Risk;** this study suggests investing more in private monitoring.

Certain levels of services in financial institutions require a standardisation of definitions. As private information and monitoring affect investment decisions through the quality and standards of accounting (Anne *et al.*, 2010).

- **Counterparty credit risk;** which is the case of moving counterparties' risk to financial institutions balance sheets, in an approach like what took place prior to and during the subprime crisis. Counterparty credit risk formed two-thirds of losses in the recent financial crisis (BCBS, 2010b).

- **Securitisaton;** Activity restrictions that were negatively associated with banks' productivity suggest modest relief of restrictions to enhance banks' productivity. Hence, financial regulators are required to enable banks' diversification as a 'productivity enhancement vehicle', but within the ring-fencing measures enacted recently.
- **Regional and Income level sensitivity;** the different levels of association between bank regulation and other variables (economic, risk and volatility) suggest that regulators should avoid regulatory arbitrage and/or umbrella regulating through more regional, rather international, conferences to raise awareness in the regional and income level subgroups of jurisdictions.

Examining bank regulation association with performance among other variables, is an ongoing viable area of research, especially in periods of bank re- or deregulations. Henceforth, this type of investigations is encouraged to become frequent to cover various geographies and in different times of financial sector behaviour. It is further advisable to conduct a similar assessment when 2018 BCP regulation survey becomes available.

## 3.6 Appendix

### 3.6.1 Information on financial and accounting variables and scalars for TFP calculations.

Variable	Description and sources
<b>Stage 1: Estimation of total factor productivity</b>	
<i>A. Bank inputs</i>	
Fixed assets	Assets that are related to physical capital (Source: Datastream and Bloomberg).
Deposits and short-term funding	Incoming funds used to generate bank outputs (Source: Datastream and Bloomberg).
Overheads	Operating expenses used in the production process of bank outputs (Source: Datastream and Bloomberg).
<i>B. Bank outputs</i>	
Net loans (loans)	Bank gross loans net of reserves for impaired loans/NPLs (Source: Datastream and Bloomberg).
Non-interest income	(Source: Datastream and Bloomberg)
<b>Stage 2: Determinants of total factor productivity change</b>	
<i>A. Banks' Internal determinants</i>	
The logarithm of total assets (LNAS)	Proxy for bank size (Source: Datastream and Bloomberg and own calculation).
The ratio of equity to total assets (EQAS)	Proxy for bank capitalisation (Source: Datastream and Bloomberg).
<i>B. Banks' External determinants</i>	
<b>I. Regulatory conditions</b>	
Capital requirements (CAPRQ)	This variable is determined by adding 1 if the answer is yes to questions 1-6 and 0 otherwise, and the opposite occurs for questions 7 and 8 (i.e., yes=0, no=1). The questions are: (1) Is the minimum required capital asset ratio (risk-weighted) in line with Basel guidelines? (2) Does the ratio vary with market risk? (3-5) Before determining minimum capital adequacy, are any of the following deducted from the book value of capital? (a) market value of loan losses not realised on the financial statements, (b) unrealised losses on securities portfolios (c) unrealised foreign exchange losses. (6) Have regulatory/supervisory authorities verified the sources of funds to be used as capital? (7) Can assets other than cash or government securities provide the initial or subsequent injections of capital? (8) Can borrowed funds provide the initial disbursement of capital? (Source: Bank Regulation and Supervision Database, World Bank; Barth <i>et al.</i> , 2001b, 2006, 2007b).

Supervisory power (SPOWER)	This variable is determined by adding 1 if the answer is yes and 0 otherwise, for each of the following 14 questions: (1) Does the supervisory agency have the right to meet with external auditors to discuss their report without the approval of the bank? (2) Are auditors legally required to communicate directly to the supervisory agency any presumed involvement of bank directors or senior managers in illicit activities, fraud, or insider abuse? (3) Can supervisors take legal action against external auditors for negligence? (4) Can the supervisory authorities force a bank to change its internal organisational structure? (5) Does the institution disclose off-balance-sheet items to supervisors? (6) Can the supervisory agency order the bank's directors or management to constitute provisions to cover actual or potential losses? (7) Can the supervisory agency suspend directors' decisions to distribute dividends? (8) Can the supervisory agency suspend directors' decisions to distribute bonuses? (9) Can the supervisory agency suspend directors' decisions to distribute management fees? (10) Can the supervisory agency supersede bank shareholder rights and declare the bank insolvent? (11) Does banking law allow a supervisory agency or any other government agency (other than a court) to suspend some or all ownership rights at a problem bank? (12) Regarding bank restructuring and reorganisation, can the supervisory agency or any other government agency (other than a court) supersede shareholder rights? (13) Regarding bank restructuring and reorganisation, can the supervisory agency or any other government agency (other than a court) remove and replace management? (14) Regarding bank restructuring and reorganisation, can the supervisory agency or any other government agency (other than a court) remove and replace directors? (Source: Bank Regulation and Supervision Database, World Bank; Barth <i>et al.</i> , 2001b, 2006, 2007b).
Market discipline and private monitoring (PRMONT)	This variable is determined by adding 1 if the answer is yes to questions 1-7 and 0 otherwise, and the opposite occurs for questions 8 and 9 (i.e., yes=0, no=1). (1) Is subordinated debt allowed (or required) capital? (2) Are financial institutions required to produce consolidated accounts covering all bank and any nonbank financial subsidiaries? (3) Are off-balance-sheet items disclosed to the public? (4) Must banks disclose their risk-management procedures? (5) Are directors legally liable for erroneous/misleading information? (6) Do regulations require credit ratings for commercial banks? (7) Is an external audit by certified/licensed auditor mandatory for banks? (8) Does accrue, unpaid interest/principal on nonperforming loans appear on the income statement? (9) Is there an explicit deposit-insurance protection system? (Source: Bank Regulation and Supervision Database, World Bank; Barth <i>et al.</i> , 2001b, 2006, 2007b).
Activity restrictions (ACTRS)	The score for this variable is determined based on the level of regulatory restrictiveness for bank participation in (1) securities activities, (2) insurance activities, (3) real estate activities, and (4) bank ownership of nonfinancial firms. These activities can be unrestricted, permitted, restricted, or prohibited and receive values of 1, 2, 3, or 4, respectively. An overall index is formed by calculating the average value of the four categories. (Source: Bank Regulation and Supervision Database, World Bank; Barth <i>et al.</i> , 2001b, 2006, 2007b).
<b>II. Market structure</b>	
Concentration (CONC)	5-bank concentration ratio (Source: 2017 update of Financial Development and Structure Database, World Bank,2017).
<b>III. Macroeconomic conditions</b>	
GDP	Real GDP growth (Source: World Bank,2017).
CPI	CPI inflation (Source: World Bank,2017).
<b>IV. Financial and institutional development</b>	
Foreign claims to GDP	Ratio of foreign claims to the banking sector over GDP: Proxy for the development of the banking sector (Source: Global Market Information Database).
ECFRM & FinFRM	Economic freedom AND Financial Freedom; Proxies for the financial sector freedom and the overall level of economic freedom. They are composite indices that are calculated by considering: business freedom, trade freedom, fiscal freedom, government spending, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, labour freedom (Source: Heritage Foundation).

## VI. Financial Stability Scores

<p>1. Capital to Assets</p> <p>2. Liquid Assets to Deposits</p> <p>3. Credit to Deposits</p>	<p>1. Regulatory Capital to Risk; Proxy for credit risk (Source: International Monetary Fund; various Global Financial Stability Reports).</p> <p>2. Raw data are from Datastream. Liquid Assets /Deposits and Short-Term Funding. Numerator and denominator are first aggregated on the country level before division.</p> <p>3. The financial resources provided to the private sector by domestic money banks as a share of total deposits. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Total deposits include demand, time and saving deposits in deposit money banks. International Financial Statistics (IFS), International Monetary Fund (IMF), 2017.</p>
<p>Banking Sector Z-score</p>	<p>Stock price volatility; the average of the 360-day volatility of the national stock market index. Bloomberg.</p>
<p>Market Volatility</p>	<p>Indicator of the overall soundness of the banking sector. It is calculated as <math>(ROA+(equity/assets))/sd(ROA)</math>, with the standard deviation of ROA, <math>sd(ROA)</math>, is estimated over a 5-year moving window (Source: 2010 update of Financial Development and Structure Database, World Bank, 2017).</p>
<p>Banking Crisis Dummy</p>	<p>A banking crisis is defined as systemic if two conditions are met: a. Significant signs of financial distress in the banking system (as indicated by significant bank runs, losses in the banking system, and/or bank liquidations), b. Significant banking policy intervention measures in response to significant losses in the banking system. The first year that both criteria are met is considered as the year when the crisis starts becoming systemic. The end of a crisis is defined the year before both real GDP growth and real credit growth are positive for at least two consecutive years. (Laeven and Fabián, 2012), “Systemic Banking Crises Database: An Update”, IMF WP/12/163.</p>
<p>OECD Countries</p>	<p>Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States.</p>

### 3.6.2 Efficiencies association with Regulatory and Macro-Environment variables categorised over Income levels.

Efficiencies	High Income				Low Income			
	<i>EFFCH</i>	<i>TECHCH</i>	<i>PECH</i>	<i>SECH</i>	<i>EFFCH</i>	<i>TECHCH</i>	<i>PECH</i>	<i>SECH</i>
<i>Obs</i>	36,037	36,037	36,037	36,037	7,348	7,348	7,348	7,348
<i>Parms</i>	15	15	15	15	15	15	15	15
<i>RMSE</i>	0.8227078	5.082041	0.8648172	0.4862833	0.7008946	1.714519	0.5714704	0.424376
<i>R-sq</i>	0.0949	0.0681	0.0988	0.0502	0.0931	0.0604	0.1664	0.1448
<i>F</i>	269.8647	187.896	282.1821	135.8557	53.75573	33.65723	104.537	88.6832
<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>CAPRQ</i>	-0.0697601***	0.1061839***	-0.0810998***	-0.0133809***	-0.0033928	0.0200942	-0.0228435***	0.0078634**
<i>ACTRS</i>	-0.0087425***	0.3539783***	-0.027616***	0.007041***	0.0122408***	-0.0214678**	0.0380562***	-0.0153651***
<i>PRMONT</i>	-0.0161775***	-0.3113438***	0.0427563***	-0.0631097***	-0.0187725**	-0.0465049**	0.028296***	-0.0318208***
<i>SPOWER</i>	0.0119129***	-0.2170182***	0.0270795***	0.0001675	-0.0564532***	0.1325492***	-0.0207595***	-0.0267246***
<i>Financial Freedom</i>	0.0010209***	-0.0121449***	-0.0008149***	0.001451***	-0.001501***	-0.0088282***	-0.0039211***	0.0015857***
<i>Concentration(5)</i>	-0.0018062***	-0.013931***	0.0024646***	-0.003452***	-0.0012425**	0.0061663***	-0.0051259***	0.0038196***
<i>Lerner Index</i>	-0.4087321***	-3.545247***	0.0155221	-0.4674596***	-0.455474***	-1.677718***	-0.3915213***	-0.0696939
<i>Market Volatility</i>	0.0008455*	0.0441159***	0.0015141***	0.0006436**	-0.0047932***	-0.0040143*	-0.0127983***	0.0067355***
<i>Z-Score</i>	0.0097251***	0.0307628***	0.0014172**	0.0060104***	-0.0024025*	0.0087009***	-0.0057922***	-0.0006107
<i>CPI</i>	0.0006265***	0.0106837***	0.0004259***	0.000667***	0.0002748	-0.0000348	-0.0002667	0.0009249***
<i>GDP</i>	0.000000108***	-0.000000178***	0.000000134***	-2.51E-09	0.0000000192***	-0.000000048***	-6.03E-09	0.0000000256***
<i>Equity/T. Assets Ratio</i>	-0.0199537***	0.0018007	-0.0112624***	-0.0061903***	0.013106***	-0.025087***	0.0050399***	0.0151059***
<i>ROA</i>	-0.020588***	0.0230595	-0.0171895***	-0.005245***	0.0127859	-0.101926***	-0.0327815***	0.0512377***
<i>ROE</i>	0.0030529***	-0.0015925	0.0009794**	0.0017239***	-0.0093401***	-0.0037619*	-0.0063498***	-0.0054022***
<i>_cons</i>	1.746427	2.037119	1.179797	1.594889	2.175499	1.062339	2.174642	0.8650418

Efficiencies	Middle Lower Income				Middle Upper Income			
	<i>EFFCH</i>	<i>TECHCH</i>	<i>PECH</i>	<i>SECH</i>	<i>EFFCH</i>	<i>TECHCH</i>	<i>PECH</i>	<i>SECH</i>
<i>Obs</i>	14,752	14,752	14,752	14,752	25,908	25,908	25,908	25,908
<i>Parms</i>	15	15	15	15	15	15	15	15
<i>RMSE</i>	0.6528808	1.246564	0.5968163	0.4128381	0.9116245	1.106603	0.8633545	0.5059234
<i>R-sq</i>	0.1967	0.0627	0.3174	0.0561	0.0727	0.1078	0.0601	0.0656
<i>F</i>	257.6768	70.45822	489.4136	62.52546	145.0248	223.4463	118.1649	129.787
<i>P</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
<i>CAPRQ</i>	-0.0485309***	-0.0210836***	-0.0463096***	0.0066282**	-0.0606559***	-0.1619709***	-0.0588996***	-0.0243228***
<i>ACTRS</i>	0.0063242***	-0.0158136***	-0.0012726	0.0082694***	-0.0632572***	-0.0018156	-0.0683688***	0.00833***
<i>PRMONT</i>	0.081184***	-0.1323214***	0.1199157***	-0.0470507***	-0.022171***	-0.0589813***	0.0322297***	-0.0538313***
<i>SPOWER</i>	0.0040266*	0.0350106***	0.0180994***	-0.0143455***	0.013476***	0.017375***	0.0286354***	-0.0041897***
<i>Financial Freedom</i>	-0.0012922***	0.0015357**	-0.0000763	-0.0018862***	0.0026436***	-0.0009918**	0.0005893*	0.0015746***
<i>Concentration (5)</i>	0.0035059***	0.005064***	0.0051021***	-0.0016824***	-0.0051691***	0.0068056***	-0.0010556***	-0.0031523***
<i>Lerner Index</i>	0.4400164***	0.1292094	0.7024908***	-0.301678***	-0.6001344***	-0.5396479***	-0.2273028***	-0.2612827***
<i>Market Volatility</i>	-0.005117***	-0.013601***	-0.0041592***	-0.0015977***	0.0020122***	-0.0022028***	0.000623	0.0006575**
<i>Z-Score</i>	0.0061957***	-0.0150797***	0.0011734	0.0046753***	0.0015753*	-0.0097337***	-0.0029232***	0.0037277***
<i>CPI</i>	-0.0005183**	-0.0003934	0.0005924***	-0.0008619***	0.0015413***	0.0011173***	0.0011505***	-0.0000827
<i>GDP</i>	0.00000012***	-0.0000000231***	0.0000000181***	-0.0000000187***	0.0000000182***	0.0000000176***	-8.35E-10	0.0000000118***
<i>Equity/T. Assets Ratio</i>	0.0214817***	-0.0229368***	0.0170734***	0.0081329***	-0.0049617***	-0.0172285***	-0.0103893***	0.008321***
<i>ROA</i>	-0.0083184***	0.0031126	-0.0107374***	0.0004101	-0.0229346***	0.018833***	0.0078202**	-0.0502953***
<i>ROE</i>	0.004776***	-0.009738***	0.0039364***	0.0023062***	0.0048447***	-0.0043023***	-0.0005044	0.0074329***
<i>_cons</i>	0.3380056	2.09689	-0.3036156	1.61225	2.336186	1.934271	1.796118	1.492529

Efficiencies association with Regulatory and Macro-Environment variables categorised over Countries as frequency weights and Income levels categories using Robust regression with bias correction term of  $1/(1-h)^2$  that is best for homoskedasticity. Results are Relatively Identical under Bias terms  $1/(1-h)$  and similar Under OLS regression. Frequency weight of Countries is implemented. \*, \*\*, \*\*\* denotes the level of significance at confidence levels of 90%, 95% and 99% respectively. N.B. Low-income: GNI per capita= \$995 or less; lower middle-income: GNI per capita between \$996 and \$3,895; upper middle-income GNI per capita between \$3,896 and \$12,055; high-income: GNI per capita of \$12,055 or more.

# **4 Financial Institutions Mergers; Systematic and Systemic Risks**

## 4.1 Introduction

The propagation of bank losses which turned a burst in the sub-prime mortgage market in the United States into a global crisis in 2007–2008 was due to fire-sale externalities fuelled by direct cross-exposures in interbank markets and interconnectedness of the financial sector and the regulatory arbitrage (Moshirian, 2011, 2012; Wagner, 2010). Bank mergers are accused of exploiting regulatory arbitrage, widening its gaps and increasing the interconnectedness, not only of different sectors but also of different and distance markets (Karolyi and Taboada, 2015a; Carbo-Valverde *et al.*, 2012). To cope with liquidity shocks and to fulfil equity requirements, most banks were forced to sell non-liquid assets, resulting in the fall in asset prices and indirect losses to the balance sheet of banks exposed to those assets (Aldasoro *et al.*, 2017).

Bank regulators have designed and started implementing new banking acts (The Banking Reform Act (UK-2013), Dodd-Frank Wall Street Reform and Consumer Protection Act (US-2010) following recommendations from the Volcker, Vickers and Liikanen Reports respectively) that limits bank exposure and minimises risks (default, systematic and systemic). However, the disgruntled financial institution started grieving the lack of capital that would enable them to face risks and defaults due to large buffers required under Basel III and the new banking acts. This unease is because these re-regulations emphasise on accounting for system stability through idiosyncratic measures of banks and other financial institutions. Which is practised at **a)** micro-prudential through establishing rules for the valuation of financial assets, assessing the riskiness of assets and ensuring staff are trained to understand risk, and **b)** by conducting system-wide stress tests to identify, monitor and take action to remove or reduce ‘systemic risk’ at the macro-prudential level.

Furthermore, under a bill that passed the US Senate this month and is now in the House of Representatives, custody-focused banks would be certified to deduct cash held on behalf of clients

from the calculation of the critical metric of Supplementary Leverage Ratio (SLR), which accounts for capital as a percentage of gross assets. Doing so would lower the amount of capital the banks need to meet the requirements of the SLR, allowing them to yield more cash to shareholders in the form of dividends and share buybacks. In contrast to this practice, relaxing constraints put in place since the financial crisis could “undermine the long-term resilience of not only the banking system but the broader economy as well”(Hoeing, 2018).

The emerging calls for deregulations and appealing some of the 2008 financial crisis aftermath banking regulations has renewed the debate over optimal/feasible bank structures. Basically, a bank structure that can sustain markets shocks and distresses and also that contribute to the system stability.

This research contributes to the renewing regulatory debate on banks sustainable structures by examining the risk effect of bank diversification versus focus. This study aims to address the multidimensional impacts and risks inherent to M&A deals, by examining, on a multidisciplinary approach, the extent of the interconnectedness of M&A, not only within the banking sector but beyond to other financial institutions. This input allows expanding awareness about sources, diversity, and variety of idiosyncratic and systemic risks in addition to enhancing the objectivity and accuracy of risk assessments. An approach that contributes to maintaining a risk-free or causal effects-free environment that would avoid adversely impair M&A transactions and post-M&A value creation. Furthermore, this appreciation would promote and multiply regulators’ ability to secure stress-resilient, market-disciplined and growth-sustainable banks as a product of M&A deals.

This research extends on the systemic level (fiscal and monetary policies) by examining the impact and association between mergers announcements and regulatory reforms and macroeconomic measures alongside bank-level performance measures of growth and efficiency. That is by investigating the impact of various bank consolidation strategies on firms’ systematic and systemic

risks using different methodologies of estimating *beta*<sup>56</sup> over various estimation methods and market indexes, as the systematic risk. An index of the expected loss in an equity value of a firm (FIs) is then developed, the Long Run Marginal Expected Shortfall (LRMES). LRMES contributes to computing SRISK, which is the capital that a firm is expected to need if we have another financial crisis. The method first evaluates the losses that an equity holder would face if there is a “future crisis” which categorises a sufficiently negative market-wide stock return.

This chapter is related to several recent papers on systemic risk, financial crisis and systematic risk and contagion effect of bank failure. However, it is among the very few studies that examined bank mergers and their impact on systemic risk, and it is the first to synthesise a model that explores factors affecting bank merger and systemic risk at the micro and macro-prudential levels, incorporating economic, regulatory and efficiency variables. This approach to calculating Beta and systemic risk is unique, and unprecedented because this study avoids using one global index as a market index (model). Regional averages indexes and regional industry and sector (financials & banks) indexes are used. This approach allows to better estimate markets, and Financial Institutions (FIs) stocks performance more realistically and avoid market biases where noise in global indexes are more persistent with broader unwanted and non-credible inferences from non-relevant industries and a multitude of non-relevant factors<sup>57</sup>. This technique also helps in avoiding misestimations due to different accounting and reporting standards among several countries (Beltratti and Stulz, 2012).

---

<sup>56</sup> Beta is a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole. Beta is used in the capital asset pricing model (CAPM), which calculates the expected return of an asset based on its beta and expected market returns. Beta is also known as the beta coefficient.

<sup>57</sup> The use of the single country market model in a multi-country event study is likely to overestimate (or under) changes in firm value (Namgyoo K. Park, 2004; Kothari et al. 2006).

Beta, LRMES and Systemic Risk are analysed against the various deal specific variables to distinguish between deal sizes and strategic options and their contribution to systematic and systemic risks. These risk variables and deal criteria are then examined against another bank (FI) specific data of size<sup>58</sup> and performance (profitability and efficiency, Sustainable Growth and Economic Value Addition) along with market stability (z-score). To Provide a holistic micro- and macroprudential approaches to this international investigation, and to avoid the misspecification of indexes due to different accounting measures applied globally, all variables are constructed over clusters. The clusters include; **a)** acquirer and target countries (home vs cross-border), **b)** target industry (non-bank activities like insurance, investment and real estate), and **c)** over macro-regulatory and macroeconomic variables of Capital Requirements, Market Discipline and Monitoring, Financial and Economic Freedom and Price Index. This study is also related to work done by Fahlenbrach *et al.* (2012) and Beltratti and Stulz (2012) analysing the determinants of banks stock performance during the financial crisis. They explain how bank performance during the financial crisis was partially determined by bank performance in the previous Long-Term Capital Management crisis of 1998<sup>59</sup>. Although with different motivation and methodology, this study devotes a section to analyse

---

<sup>58</sup> Recent evidence on firm level systemic risk for US and European banks shows that common systemic risk indicators are primarily driven by firm size implying an overriding concern for “too-big-to-fail” institutions. Varotto and Zhao (2018) also show that smaller banks can also pose considerable systemic threats, Northern Rock case in 2007 is an example.

<sup>59</sup> Long-Term Capital Management (LTCM) was a large hedge fund with main branches in UK and US, that nearly collapsed the global financial system in 1998. This was due to LTCM’s high-risk arbitrage trading strategies. An example of an arbitrage trade would be a change in interest rates not yet adequately reflected in securities prices. This could open opportunities to trade such securities at values, different from what they will soon become, once the new rates have been priced in. LTCM also dealt in interest rate swaps, which involve the exchange of one series of future interest payments for another, based on a specified principal, among two counterparties. Due to the small spread in arbitrage opportunities, LTCM had to leverage itself highly to make money (Dungey *et al.*, 2007).

systematic and systemic risk, besides other determinants from economic and regulatory perspectives, against bank merger announcements took place during the 2008-2011 crisis.

The distinctiveness of this study is through its motivation to uncover various properties of FIs mergers and their success determinants, which would contribute to a more resilient financial system and consequently global business environment. This approach will contribute to developing a prudential policy that enables FIs to avoid or sustain financial and economic difficulties. This examination proceeds over the relative merits of bank focus vs diversification through a heterogeneous sizeable international sample of bank M&A deals that took place between 1992 and 2017. Bidders are the listed international banks and a variety of listed target FIs that have their primary source of income from commercial banking, investment and insurance and asset management activities<sup>60</sup>. The sample carries additional importance about its time span as it extends from 1992 to 2017. The sample incorporates several regulatory reform proposals and acts that were preceded and followed by the 2008-2011 financial crisis, which affected the diversification-focus bank mergers landscape<sup>61</sup>.

Following sections present a review of bank risks and mergers literature, methodology, and data followed by results and the conclusions.

---

<sup>60</sup> From several geographic regions and blocks (North America, Australasia, European Market, BRICS, Emerging markets), several institutions' sizes, currencies, regulators, markets, and geographies.

<sup>61</sup> (In the US; Financial Services Modernisation Act in 1999, In Europe; the Second Banking Directive (1989) implementation, Dodd-Frank Act announcement in 2010, In the UK; Vickers' Report in 2011 transcribed in the Act (Banking Reform) in 2013, In Europe; Liikanen et al. (2012) report blending the US Dodd-Frank and the UK Financial Services acts).

## **4.2 Bank mergers and risks; a literature review**

The banking industry is influenced and driven by macroeconomic dynamics (Bostic *et al.*, 2009; Cooper and Dynan, 2014). Dynamics which demand banks, to survive volatile and uncertain environments, to maintain competitive advantages through risk management, strategic efficiency and performance management when considering restructuring or diversification via mergers and/or acquisitions. A vital aspect of this performance and risk management through bank consolidations is the adverse selection of targets firms. Moreover, the adverse scenarios of the M&A process and the resulting risks at the micro- and macro-levels associated with different targets. Namely, understanding and gauging (evaluating) the variations of systematic and systemic risks with the variation of targets firms is essential to differentiate the scale and scope of risks generated from focused and diversified bank mergers.

Do bank mergers add to the instability of the financial system? Also, how? Bank mergers could stabilise an individual bank and decrease its contribution to systemic risk because consolidation can lead to an increase in the diversification of the company's assets and loan portfolio and consequently higher capital buffers (Weiß *et al.*, 2014). However, the financial system could get more fragile as these individual risks are reallocated (instead eliminated) across the system. This reallocation of risks leads to having individual institutions to be exposed to similar risks allowing a systemic shock at an individual institution to be transmitted to the whole system, due to functional and/or geographical interconnectedness through consolidations (country risk, liquidity and solvency risk and credit risks) (Wagner, 2010).

Furthermore, bank consolidations create larger institutions that reach the level of “Too Big to Fail” (TBTF) or Systemically Important Financial Institutions<sup>62</sup> (SIFIs or Too SIFI) posing a more significant threat at systematic and systemic levels (Berger, 2000). Recent turbulence in the financial system raised the discussion regarding new supervisory and regulatory tools for financial institutions. The recent introduction of additional capital requirements<sup>63</sup> for SIFIs (and TBTF) is an example of tangible measures taken by regulators to consider, isolate and eliminate systemic risk.

Consequently, the debate on the optimal bank and FIs structures follows two different 'diversification hypotheses' (Herring and Santomero, 1990; Piloff and Santomero, 1998; Herring and Carmassi, 2010; Molyneux *et al.*, 2014); Diversification-Stability and Diversification-Fragility.

#### **4.2.1 Diversification-Stability**

Bank diversification allows banks to diversify risk by having a lower correlation in their portfolio of assets and activities and generating economies of scope and scale and increased efficiencies through cost-saving and revenue enhancements (Houston *et al.*, 2001; Vennet, 2002; Hirtle and Stiroh, 2007). Hence, a positive association exists between the degree of banking market concentration (Number of Banks in a Certain Market) and financial stability (Marcus, 1984; Repullo, 2004; Keeley, 1990). On the diversification stability camp also stand several theories. Boyd and De Nicoló (2005) and De Nicoló and Lucchetta (2009), among others, support diversification from a

---

<sup>62</sup> As the Financial Stability Board (2010), SIFIs are defined as financial institutions “whose disorderly failure, because of their size, complexity and systemic interconnectedness, would cause significant disruption to the wider financial system and economic activity”. According to the Basel III agreements, these institutions should face a capital ‘surcharge’ determined according to the ‘negative externalities’ they generate, i.e. their contribution to the aggregate risk of the financial system.

<sup>63</sup> In Basel III and in The Banking Reform Act (UK-2013), Dodd-Frank Wall Street Reform and Consumer Protection Act (US-2010) following recommendations from the Volcker, Vickers and Liikanen Reports respectively.

moral hazard perspective. They argue that, in case of decreased level of competition due to increased market concentration, banks can charge higher loan rates. This higher charge exacerbates moral hazard issues on the borrowers' level. Borrowers will then be induced to invest in riskier projects, resulting in higher riskiness of the bank's lending (asset) portfolio increases. Notably, Mishkin (1999) goes to the extent to argue that banks in concentrated markets are more likely to be too-big-to-fail, leading to rising of the moral hazard problem on the part of bank managers. Connectedly, bank focus and concentration of activities and geographies are seen to increase the ex-ante risk of financial contagion. Because of the probability that a particular bank is large enough to impact the rest of the system increases with the degree of market concentration (Nier *et al.*, 2007). Monitoring and supervision are also argued under the diversification stability theory and provides a contra argument to the above mentioned over the difficulty of supervision and monitoring when banks are diversified. De Nicoló and Lucchetta (2009) and Beck *et al.* (2006) argue that the supervision of concentrated banking markets is more difficult because banks in such markets tend to be larger and more complex than their counterparts operating in more diffuse markets. Hence, following the portfolio theory, it is synthesised that geographic expansion should lower a bank's risk especially when it involves adding assets whose returns are poorly correlated with existing assets (Amihud and Lev, 1981). Furthermore, if diversification helps to create too big or interconnected to fail banks, government guarantees (implicit or explicit) can and would lower the risk of investing in the bank (Gropp *et al.*, 2011). Hence, stability literature emphasises that efficiencies (cost and scale) experienced by diversified banks can enhance stability (Diamond, 1984; Boyd and Prescott, 1986; Schaeck and Cihák, 2014).

#### **4.2.2 Diversification-Fragility**

Bank diversification increases system interconnectedness, that is seen as the conveyor of failures by transmitting risks among financial institutions (Berger *et al.*, 2012). Risks of financial

conglomeration, spill-overs<sup>64</sup> and 'too-big-to-fail or discipline' institutions are other concerns of the opponent view to diversification (Berger and Humphrey, 1994; Moshirian, 2012). Additionally, diversification is realised to have decreased efficiency and created negative economies of scope (Laeven and Levine, 2007; Stiroh and Rumble, 2006; Gambacorta and Rixtel, 2013). Moreover, while restructuring mergers are less likely to lead to the moral hazard problem (stepping to bail-out defaulted banks), regulators reinforce a trend of an increasing degree of market concentration in the financial sector (Vives, 2011). Other theoretical studies indicate that this trend of consolidation is likely to make the financial system more fragile (Nier *et al.*, 2007; Boyd and De Nicoló, 2005; De Nicoló and Lucchetta, 2009).

Advocates of concentration–stability (diversification-fragility) argue that banks in more concentrated markets tend to be more stable due to either the charter value hypothesis or the adverse selection and better-informed position hypothesis (Ijtsma *et al.*, 2017). Charter value hypothesis suggests that the bank's charter is more treasured when the bank operates in a less competitive environment with high expected future profits. Consequently, banks, in more concentrated markets, will be **a)** less interested in overly or disproportionately risky lending (Chan *et al.*, 1986; Repullo, 2004; Allen and Gale, 2004) and **b)** will better scrutinise loan applications to safeguard their charter value (Hauswald and Marquez, 2006; Cordella and Yeyati, 2002). Both outcomes are beneficial for financial stability. On the other hand, in concentrated markets, banks are more familiar and more informed about a more substantial proportion of clients/borrowers. Hence, bank decisions about credit

---

<sup>64</sup> The spill-overs or the transmission of shocks (risk) from the financial sector to the real economy (Baur, 2012; Melvin and Taylor, 2009) and the interactions between global imbalances, credit risk spreads, housing markets and macroeconomic variables and across markets (Chevallier, 2012).

(risk) are further learnt, making banks less exposed to credit risk (Marquez, 2002). In a similar vein, the literature has highlighted that expansion (diversification) increases bank risk by exploiting the Agency-based models of corporate expansion. Berger and Ofek (1995), Servaes (1996) and Denis *et al.* (1997) argue that banks expand (geographically) to reap the private benefits of managing a vast “empire” even if it comes on account of less loan quality and increased bank fragility.

Another advantage of focus promoted by diversification fragility advocates is the problem of contagion effect and the complication of having too many regulators when operating in different industries (or countries). If a bank was near failure and threatened the stability of a specific financial system, an agreement to rescue the troubled bank to prevent contagion is more easily reached in concentrated markets than in fragmented or diversified ones. Alternatively, this, contagion is less likely to occur in more concentrated markets (Sáez and Shi, 2004), especially when considering the enhanced ease of monitoring and lessened opportunity of regulatory arbitrage<sup>65</sup>. Furthermore, Brickley *et al.* (2003) and Berger *et al.* (2005) analyse that distance can encumber the ability of a bank’s central services to monitor its subsidiaries, leading to potentially adversative effects on asset quality. Hence, the same way that non-specialisation functionally and geographically increases complexity, it hinders FIs’ ability to monitor loans quality and manage risk (Winton *et al.*, 1999).

---

<sup>65</sup> Regulatory arbitrage is a practice whereby firms capitalise on loopholes in regulatory systems to circumvent unfavourable regulation. Despite the large level of international bank flows, and despite attempts to increase the global coordination of bank regulation, much of banking regulation and supervision remains jurisdiction (national) level. Cross-country regulatory competition, as a form of regulatory arbitrage, may enable banks to effectively evade costly regulations. Such regulatory competition enables banks to circumvent avoid regulations and take excessive risks (Barth *et al.*, 2008c). These types of regulatory arbitrage activities expose several jurisdictions to the influence of excessive risk taken at one, considering the interconnected nature of financial markets and institutions (Houston *et al.*, 2012).

### 4.2.3 Financial Institutions Risk; Empirical Literature

Hence, Bank consolidations are sensitive to systemic and endogenous risks<sup>66</sup>. Empirical studies show that M&A in the post-crisis period is mostly associated with rescuing banks from underperformance (Molyneux *et al.*, 2014). Furthermore, a key indicator of bank mergers' sensitivity to macroeconomic shocks is banks' homogenous behaviour during crises (Calmès and Théoret, 2014). Moreover, the acquiring and target banks are differently affected by M&A (Du and Sim, 2016) notably those that have their homes in countries with different economic systems (Shirasu, 2018). The vulnerability and sensitivities decrease bank mergers ability to synergise value, thus ensuring risk minimisation, and the more they become prone to the risk of failure.

Hereafter is a review of the related (empirical) studies on the relative merits of the different orientations of bank mergers; focused and diversified ones; following the theoretical differentiation of business strategy development (growth) matrix advanced by Ansoff (1957)<sup>67</sup>.

Empirically, financial market mergers literature offers varying manifests pertaining to risk initiation and propagation due to diversification. Amihud *et al.* (2002) argue that geographic diversification overall does not increase or decrease risk. However, Elyasiani *et al.* (2012) and Casu *et al.* (2015) support banks' diversifying M&A deals into insurance as they provide higher returns and

---

<sup>66</sup> Endogenous risk refers to the risk from shocks that are generated and amplified within the system. It stands in contrast to exogenous risk, which refers to shocks that arrive from outside the system. Financial markets are subject to both types of risk. However, the greatest damage is done from risk of the endogenous kind. while the seeds of the volatility are exogenous, a large part of its eventual realized magnitude is due to the amplification of the exogenous news within the system (Danielsson and Shin, 2003; Danielsson *et al.*, 2012).

<sup>67</sup> Ansoff's matrix maps business strategic orientation on the dimensions of product (function) and Market (Location). Banks can follow a market penetration strategy, i.e. a focus approach by merging with other banks in same location and conducting same activity (products). Banks can also expand their portfolios through developing and diversifying their markets or products (market or product development) or by diversifying both market and products at once to have complete diversification.

lower risk for banks but not to diversify into investment activities. In the same vein, Wagner (2008; 2010) concurs when examining diversification and its contribution to the financial crisis. Additionally, although risk and return profiles of banks' focus and diversification are repeatedly investigated in the literature, there still exists a significant inconclusiveness pertaining to which diversification – focus strategy is optimal for the financial institution and its market (Goddard *et al.*, 2012a; DeYoung, 2012; De Carvalho *et al.*, 2012). DeYoung *et al.* (2009) also argue that evidence on the impact of both geographic and product diversification via merger is still mixed. Further, the role of the level of analysis has been ignored by the existing literature on the concentration and diversification-stability nexus. Existing studies typically focus on either bank-level or country-level examination of risk and stability.

Ibragimov *et al.* (2011) emphasise on the diversification fragility theory and investigates the contagion effect of bank failure through several models of risk propagation. They argue that risk propagates through an externality (negative), in which the failure of some institutions triggers the failure of others. They conclude that banks' attempts to diversify, which might be optimal for individual banks, may prove to be sub-optimal for society. Mainly because externality critically depends on the distributional features of the risks. Similarly, Caballero and Krishnamurthy (2008) and Brunnermeier and Pedersen (2009) have also addressed contagion and the negative externalities due to interconnectedness, and the extra time it takes an FI to recover when many defaults occur at the same time, leading to risk propagation and development into systemic risk.

#### **4.2.4 Financial Institutions Risk and crisis**

Another strand of related literature analyses the causes of system-wide crises and systemic risk from the country level perspective, mostly using a bank crisis dummy (indicator) variable. Examining the effect of banking market concentration on systemic risk and the possibility of a financial crisis,

Beck *et al.* (2006) and Schaeck *et al.* (2009) find that higher levels of banking market concentration decrease the likelihood of a financial crisis. However, Boyd *et al.* (2009) find contrasting evidence. They find that increased banking market concentration leads to a sharp decline in lending, which is symptomatic of crisis. Although this focus on examining real crises can be intuitively attractive, it has a downside that an indicator (dummy or theorised) variable does not deliver information about the intensity of the crisis and its magnitude in losses in capitals nor about the fragility of the sector before the crisis (or after). Consequently, several recent studies follow the bank-level analyses utilising the z-score as a proxy of the solvency of individual banks. Combining aspects of the country-level and bank-level approaches Uhde and Heimeshoff (2009) find a negative relation between banking market concentration and financial stability (aggregating the z-score of individual banks to synthesise the whole system Z-score which can be taken as measuring the solvency of a country's financial sector).

#### **4.2.5 Financial Institutions Risk Measures**

Using the marginal expected shortfall and the lower tail dependence measures, Weiß *et al.* (2014) find evidence for a significant increase of systemic risk contribution following bank mergers, thus confirming the “concentration-fragility” hypothesis. An essential variance with this study is that Weiß *et al.* (2014) have not highlighted the diversification aspect of the mergers and their impact on systemic risk, as they have excluded insurance companies and real estate business from the target banks. Secondly, this investigation examines the risk effect of bank mergers at the systematic level

before the systemic level<sup>68</sup>. Amihud *et al.* (2002) and Vallascas and Hagendorff (2011) have investigated the influence of bank consolidation on the bidder's systematic risk or default risk. Examining the effects of cross-border bank mergers on the risk and (abnormal) returns of acquiring banks, Amihud *et al.* (2002) find no impact of merger announcement on acquirers' risk (total risk and systematic risk relative to home-home bank mergers).

Similarly, Vallascas and Hagendorff (2011) show that, generally, bank mergers are risk-neutral. However, they also argue that there exists a surge in default risk when relatively sound and safe banks are involved in a merger with cross-border, activity-diversifying deals or large deals, especially when deals are done under weak regulatory regimes. However, Chong (1991), Demsetz and Strahan (1997) and Acharya *et al.* (2006) find that geographically diversified banks generally choose riskier loans.

In contrast, Akhigbe and Whyte (2003), Calomiris (2006) and (Deng and Elyasiani, 2008) show evidence that risk falls as banks (Bank Holding Companies-BHCs) expand geographically. Especially in the case of the United States during the early 2000s when diversification was inhibited, leading to increased fragility of the US banking system. Goetz *et al.* (2016) pose the issue of ambiguity in what type of consolidation works best for decreasing risk. Hence, the challenge is identifying an exogenous source of variation in geographic diversification. They measure risk using the standard deviation of banks' stock returns (Atkeson *et al.*, 2017) beside the Z-score. They find that, on average, an exogenous increase in the geographic diversity of the BHC's deposits lowers

---

<sup>68</sup> On the further technical side, using dynamic beta is crucial in international studies (Brownlees and Engle, 2012) which is not implemented in Weiß *et al.* (2014), apart from not clustering the sample into regions and countries to reflect and address the impact of different regulatory systems (capital requirement and activities restrictions to name few) and accounting standards.

BHC risk, because geographic expansion lowers bank risk by enabling banks to diversify their exposure to idiosyncratic local market risks.

Trivially connected, Ijtsma *et al.* (2017) investigate the causal relationship between banking market concentration and the Z-score at both the bank level and the country level. They find a limited effect of concentration on stability. They also suggest that bank M&As, and more explicitly restructuring mergers that are often regulators-arranged to restore financial stability during crises, are not likely to substantially contribute to instability.

In a closely related concept to this investigation, Engle and Zazzara (2017) examine systemic risk (SRISK) to quantify the estimated capital shortfalls of financial institutions in response to three different events that occurred in 2016: the Brexit vote, the Trump election, and the Italian Referendum. They claim that, despite the distortion from noise in the markets, the dynamic and forward-looking nature of SRISK as a metric contributes to increasing the transparency around the quantification of systemic risk. Regardless of the exact results of this analysis<sup>69</sup>, examining systemic risk as a response to an event is the main commonality between this study and Engle and Zazzara (2017). Especially about the methodology of synthesising SRISK from banks' stocks returns, despite the novelty in this approach, by using countries market index and countries financial industries index as reference market rather a single worldwide index (MSCI).

---

<sup>69</sup> Their SRISK analysis of Brexit, the Trump election, and the Italian Referendum shows a material but temporary increase of aggregate systemic risk in the wake of these events. More importantly, it shows how individual financial institutions contribute to specific stress conditions. A recurring finding from these three cases is the presence of both Banks and Insurance companies as the main contributors to aggregate systemic risk. Considering that some Asset Managers are part of these financial conglomerates, then any kind of financial institution can present transmission channels in terms of systemic risk.

Hence, the literature continues to yield conflicting evidence on the impact of bank mergers, and consequently concentration (focus) and diversification, on risk and stability (Boyd and De Nicoló (2005); Jiménez *et al.* (2013); Fiordelisi and Mare (2014)). Furthermore, recent bank regulations (following the 2008-2011 financial crisis) appear to have under conceptualised the issue of macroprudential regulation of the M&A processes. Several essential M&A aspects like operating and financial synergy and their contribution to the post-M&A performance of profitability, economic value creation and sustainable growth as well as their links to financial regulation and dependence on macroeconomic parameters are still missing. Understanding and quantifying these influences and factors help to evaluate their contribution to systemic risk and clarifies the misconception of systemic risk factors underlying M&As that are critical for post-crisis recovery and financial stability.

Literature inconclusiveness, combined with the renewed policy debate on the optimum bank's structures, that best create value and prevent risk and its propagation into distresses, motivates the examination of the diversification hypothesis, through investigating different markets reactions to different bank mergers, banks' and target FIs *systematic* risk and their *systemic* risk contributions.

### **4.3 Data and Methodology**

Although bank mergers implications have been argued on the bases of diversification-stability or fragility theories, the increased connectedness of merged banks and financial institutions is more precise and more distinct. Naturally, because the merging institutions turn to be either one portfolio of investments and assets managed by one team and resources or two very related and correlated portfolios and most commonly managed by the same team and resources. This connectedness between financial institutions is a constant concern for regulators and scholars in the field, mainly because it permits the spread of benefits and performance and allows efficiency enhancements same as it may allow contagion of distress and difficulty and leads to a widespread crisis.

The interconnection of financial institutions has been amplifying overtime powered by innovation and mergers, generating a risk of disturbance in a financial system to levels where economic growth and welfare would critically suffer (Detken *et al.*, 2018; ECB, 2018). Therefore, it is relevant and imperative to monitor systemic risk and its inferences at the micro and macroeconomic levels. De Bandt and Hartmann (2000) and Hoggarth *et al.* (2002) justifies the occurrence of such contagion through several mechanisms: a) direct bilateral exposures between banks; b) correlated exposures of banks to a common source of risk, c) feedback effects from endogenous fire-sale of assets by distressed institutions, and (d) informational contagion. Bank mergers are challenged that they can satisfy the full spectrum from direct bilateral exposure to informational contagion. Hence the necessity of examining mergers and acquisitions impact on risk, systematically, and its system impact through systemic risk in addition to other micro and macroeconomic and prudential (regulatory) factors.

The investigation of the impact of bank mergers on risk examines two primary metrics:

- ***beta***, which calculates the extent of systematic risk and is the coefficient of an OLS regression of firms stock returns over market returns (Industry).
- ***SRISK***, which is calculated by partially following Engle and Zazzara (2017) estimates the expected capital shortfall faced by a firm in a potential future financial crisis. SRISK is conceptually comparable to the stress test applied to financial institutions. However, it is based exclusively on the publicly available information (market and accounting data). Firms with a high capital shortfall in a crisis (when capital is low in the financial system) are the potential firms to spread the crisis and impact the broader economy and probably extend it chronologically.

This study analyses the changes in the acquiring and target bank's risk around the announcement of a (completed) merger or acquisition deal. This chapter examines and analyses both

systematic risks, through beta coefficients, and systemic risk through the SRISK metric. Further, it also analyses the value (abnormal return) effects of these acquisitions, along with performance changes of efficiency, productivity, economic value addition, sustainable growth and profitability. Bank-country regulatory indices of capital requirements, activities restrictions, private monitoring and supervisory power, are also examined for their impact on bank risk due to their direct impact on bank mergers and the permissibility to diversify activities and geographies.

### **4.3.1 Dataset**

This study provides a considerable improvement over current empirical literature for its sample and representation and for determining several auxiliary and associated variables to bank risks. The sample covers 1,286 mergers and examines both sides of the merger; acquiring banks and targets financial institutions that can be banks, investment companies, insurance companies, or real estate companies. These inclusion criteria make the number of firms investigated to be 1,843 (1,286+557) firms.

The main criteria for inclusion are for a bank to be involved in an M&A deal with another financial institution between 1992 and 2017. Hence, stock prices are gathered for bidding banks and targets a financial institution that is a commercial bank, insurance company or brokerage, investment bank or asset management firm, which has announced an M&A deal worldwide. Stock prices for the included institutions are procured from Bloomberg using Bloomberg Industry Classification Systems (BICS) Ticker code of banks that announces taking part and completing an M&A deal. Deal size is set to be greater than or equal \$U.S. 100 Million as smaller transactions are usually done by specialised boutique firms where the ambiguity of payment and reporting methods increases (Beitel and Schiereck, 2001), and deals that are over 100 million dollars are likely to have high 'institutional

presence' in deal commissioning and negotiation (John et al., 2014)<sup>70</sup>. If the M&A deal leads the acquiring bank to increase its existing ownership from the range of 0% - 20% targeting the 51 - 100% range, the deal announcement is also included. Consecutively, a bank is included if it announces a bid to acquire additional shares in another bank, insurance company, investment bank or asset management firm that enables the bidding bank to have a controlling stake in the target firm. Moreover, depending on the target industry and geography, deals are categorised in two distinct levels of activity and geographic diversification and focus.

For the risk analysis, corresponding bidders and targets risk score of beta are calculated following Engle (1990), Engle and Victor (1993), Bollerslev (2009) and Engle (2009). However, with a vital difference that substitutes the use of dynamic beta over a single worldwide index of MCSI, that is by using individual countries Local Market Index and Local Financial Industry Index. This technique adds to the distinctiveness of this study and enhances the robustness of results by avoiding a beta, as an index of systematic risk, being calculated against an international index that has a multitude of factors affecting its behaviour<sup>71</sup>. Furthermore, using local index addresses the complications of differing accounting systems among jurisdictions for multivariate analysis of variables of profitability, efficiency and all balance sheet items. It also addresses the arguable nature

---

<sup>70</sup> Typically, the big firms will compete most aggressively for exit transactions above \$100 million because these transactions will produce several million dollars in fees. The \$10 to 50 million range is the optimum range for the mid-sized firms. Beitel and Schiereck (2001) also argue that, in their 2002 study, the 33 smallest deals that are of value between USD 100 million and USD 449 million do not show any significance at all, which make it a range worth further examination. Piloff and Santomero (1998) argue that economies of scale also exist for institutions holding less than \$100 million in assets. This implies that a merger between two firms with deal value equal or greater than \$100 million will incorporate a variety of institutions' sizes.

<sup>71</sup> See Heaton (1995) and Koedijk *et al.* (2002) for an extensive analysis on the differences and divergence between local index and one unified international index when benchmarking or examining changes of returns and abnormal returns calculation.

of how international indices are calculated using different tiers of one global index, usually US-based, added to regional and country exposures and exchanging to various currencies, which is in itself problematic, before reaching one global index. Therefore, bank risk is synthesised through;

- Estimating *beta* coefficients; of the abnormal returns using an event study methodology, which formulates systematic risk (sections 3.2 and 3.3),
- Calculating *SRISK*; with Beta (from a) being a factor of its model to calculate the long-run marginal expected shortfall *LRMES*, along with quasi-leverage *LVG*<sup>72</sup>, prudential capital fraction *k* (5.5% for Europe, 8% elsewhere) and market value of equity (section 3.4).

### 4.3.2 Returns and beta estimation

The purpose of the event study methodology<sup>73</sup> is to measure abnormal returns (AR), that are the deviation of actual stock returns from expected stock returns, as a result of an event, to account for the impact of this event on firms' stock prices. In the context of this study, the event is the merger or acquisition announcement of a bank with another financial institution. Therefore, following Brown and Warner (1985) methodology of event study, abnormal returns  $AR_{i,t}$  for institution  $i$  at time  $t$  can be calculated as the difference between Expected Log returns  $E(R_{i,t})$  for institution  $i$  at time  $t$ , (estimated using Ordinary Least Squares' regressed) and the market  $M$  Log return  $R_{M,t}$  at the same time  $t$ , as per the following equation;

---

<sup>72</sup> Quasi Leverage –  $LVG = (BA - BE + MV) / MV$ , where where BA is the book value of assets, BE is the book value of equity, and MV is the market value of equity.

<sup>73</sup> The event study methodology, undergone several developmental phases from when it was initially started with Dolley (1933). Modern event studies, especially in the finance literature, are conducted on the groundwork of Ball and Brown (1968) and Fama et al. (1969). Brown and Warner (1985) and Kothari and Warner (2007) worked on making event study methodology more statistically valid through enhancing the rigor of models used and resolving methodology issues of events clustering, abnormal returns aggregation and variances changing.

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (4.1)$$

Then *ARs* are aggregated over event windows (M&A announcement) to find cumulative abnormal returns *CAR* magnitude and significance.

In this study, the analysis is based on an estimation period of 200 trading days (-241 to -41) before the event announcement(s) ( $t = 0$ ), leaving an 81-day (-40, + 40) window for the event study period<sup>74</sup>. The market return approach calculates abnormal returns as the difference between actual log-returns and the log returns expected. Expected returns are calculated using an OLS (Ordinary Least Squares) regression by generating Alphas  $\hat{\alpha}$  and Betas  $\hat{\beta}$ , that are the coefficients to estimate normal or expected returns, for stock prices during the event window (Brown and Warner, 1980; MacKinlay, 1997).

$$AR_{i,t} = R_{i,t} - \hat{\alpha} - \hat{\beta}R_{m,t}$$

Where  $\hat{\alpha}$  (intercept) and  $\hat{\beta}$ (slope) are OLS values from the estimation period.  $R_{m,t}$  are equities' local markets indices (LI), they are stripped from Bloomberg platform using stock Tickers identification code that allows for pulling firms local markets' indices. For robustness of *CARs* and Betas, abnormal returns are also calculated based on estimating expected returns from local industry indices (FII). Later in the study, FII was adopted because they proved to be more robust and rigour when tested for significance and correlation. Furthermore, FII reflects the sensitivity of banks risk

---

<sup>74</sup> This estimation window should balance the trade-off between the reasonable length (to provide sufficient time to identify 'typical' returns patterns) and sample size and at the same time as a precaution against contamination or noise in longer windows. Long estimation windows will in general increase the precision parameters, but not longer than 300 days prior to the event window as this might lead to a structural break in the sample (Armitage, 1995).

more accurately and significantly compared to estimating expected returns over a global index and then synthesise abnormal returns (Heaton, 1995; Koedijk *et al.*, 2002).

### **4.3.3 Systematic Risk – $\beta$ ( $\hat{\beta}$ ) and $\beta^*$**

Beta measures the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole. Beta is an important measure because it accounts for the risk of an investment that cannot be reduced by the diversification provided by the portfolio of many risky assets; because it measures the part of the asset's statistical variance and the correlation of its returns with the returns of the other assets of the portfolio<sup>75</sup>. It does not measure the risk of an investment idiosyncratically, rather the amount of risk the investment adds to an already-diversified portfolio (Fama, 1976). Systematic risk is also known as “undiversifiable risk,” “volatility,” or “market risk.” This type of risk can not be predicted nor entirely avoided. It cannot be mitigated through diversification, only through hedging or by using the correct asset allocation strategy (Saunders *et al.*, 1990).

Beta represents the tendency of a security's returns to respond to swings in the market<sup>76</sup>. Following Amihud *et al.* (2002), this section analyses the changes in the beta of log returns between post-merger and pre-merger announcements, denoting the change in beta by delta beta ( $\Delta\beta$ ). However, this method improves over Amihud *et al.* (2002) by analysing not only cross border

---

<sup>75</sup> Interestingly, the firm betas reflect the characteristics of the crisis and their impact on each firm. For example, in the Great Recession, the beta of Bank of America and Citigroup rose to 3 and 4 while neither Goldman nor BNP Paribas moved much at all. They were not involved in the subprime mortgage business. However, in the European Sovereign Debt Crisis, Credit Agricole and BNP's betas rose almost to three as these banks were very exposed to Greek and other peripheral country debt.

<sup>76</sup> A security's beta is calculated by dividing the covariance the security's returns and the benchmark's returns by the variance of the benchmark's returns over a specified period. Although Beta is widely used in the capital asset pricing model (CAPM), which calculates the expected return of an asset based on its beta and expected market returns.

mergers but analysing different combinations of mergers strategic orientation and expanding to examining systemic risk contributions of these mergers announcement and completion along with other micro and macro factors. This method estimates beta coefficients of Log returns of individual FIs against the expected log-returns of the *local financial industry* index (FII) of the seven markets clustered over seven geographical regions. These regions are Western Europe, Eastern Europe, Asia, Africa, North America, South and Middle America, and a group name ANJ that includes Australia, New Zealand, and Japan. That is because of the several limitations of the CAPM<sup>77</sup>. Hence, systematic risk imposed by a bank *i* merger upon announcement of a merger at time *t* is;

$$\Delta\beta_{i,t} = \beta_i(\text{after}) - \beta_i(\text{before}) \Rightarrow \Delta\beta_{i,t} = \beta_{i,t+1} - \beta_{i,t-1} \quad (4.2)$$

Beta (*before*) is the beta of log returns estimated over 10 to 241 days before merger announcement (-241, -10 days). Beta (*after*) is the beta of log returns estimated over 10 to 100 days after merger announcement (+10, +100 days). A narrower window after merger than before merger is utilised in order to avoid noise in FIs returns generated from factors other than the merger announcement and at the same time that allows for the merger to become closer to completion and allow for operational and reputational advantages to materialise, but not to fade with wider windows (Altunbas *et al.*, 2018; Amihud and Lev, 1981; Berger *et al.*, 2013).

---

<sup>77</sup> CAPM limitations starts from the assumptions of the model with which many criticise as being unrealistic. For instance CAPM assumes that all investors are risk averse by nature, they have the same time period to evaluate information, and that there is unlimited capital to borrow at the risk-free rate of return. Additionally CAPM assumes that investments can be divided into unlimited pieces and sizes and that there are no taxes, inflation or transactions costs. This unrealistic in general, and specifically in the financial sector and under the merger and acquisition theme where there are massive transaction cost with taxes at its heart, and there exist limits on borrowing capitals that can be at risk prior, during and after merger announcements. For detailed analysis check Mandelker and Rhee (1984), and Balvers and Huang (2009).

If  $\Delta\beta_{i,t}$  took a value less than zero ( $<0$ ), it means that Beta (*after*) of the acquiring bank is smaller than Beta (*before*), i.e. systematic risk has decreased. The opposite is true for when  $\Delta\beta_{i,t}$  is positive, suggesting an increase in systematic risk. A zero value of  $\Delta\beta_{i,t}$  suggests no risk effect of the merger announcement. In the context of this study, merger deals are categorised over different strategic orientations of product and activities focus and diversification. Therefore,  $\Delta\beta_{i,t}$  analysis enables distinguishing between which type of mergers (and deal and market criteria) affects the growth or decline of institutions systematic risk.

A contribution to the recent risk literature is through utilising Hamada (1972) and Rubinstein (1973) approach of decomposing systematic risk into operating risk and financial risk. Their model structures the levered bank's (FI's)  $\beta$  in terms of the unlevered bank's (FI's)  $\beta^*$ , corporate income tax rate  $t$ , the market value of debt  $D$  and market value of equity  $E$  as per the following:

$$\beta = \beta^* + \beta^*(1 - t) D/E \quad (4.3)$$

Hence, this model can be re-written to calculate the unlevered bank's (FI's)  $\beta^*$  as follows:

$$\beta^* = \frac{\beta}{1 + (1 - t) D/E} \quad (4.4)$$

Where  $\beta^*$  represents and measures operating risk while  $\beta^*(1 - t) D/E$  represents financial risk.

Betas are then panelled along with other institution, deal and industry variables. The panel expands to include measures of the capital shortfall (LRMES) and systemic risk (SRISK) calculated as a reaction to the bank M&A announcement. This approach contributes to understanding the association and sensitivity (insensitivity) of the systematic-undiversified FI risk to deal criteria and more importantly to deal types on the relative merits of the focused deal (bank to bank) and diversified ones (bank to insurance, investment or real estate businesses).

#### 4.3.4 Systemic Risk

Systemic risk is a measure that helps account for the probability and magnitude of a firm's capital to diminish in a case of system-wide distress or crisis. Systemic risk is a metric that quantifies how much capital a financial institution would require to raise to function normally under a crisis event (Engle and Zazzara, 2017). In systemic risk calculation, a model that engulfs beta as a systematic risk index as a component to estimate capital shortfall is followed, besides debt and equity market values, and capital ratio and leverage. This is a better method compared to several used in scholarly and industry (Brownlees and Engle, 2017; Acharya *et al.*, 2012) primarily because it determines the systemic risk posed by an institution as the institution's loss conditional on system distress and not the opposite. This approach fits the examination of SRISK impact from M&A announcement at FIs level as a deductive approach and not the impact of systemic distress on individual institutions inductively, making it an efficient cross-sectional measure<sup>78</sup>.

One of the “inductive” approaches to systemic risk is the DCoVaR ( $\Delta\text{CoVaR}$ ). This measure, introduced by Adrian and Brunnermeier (2016), uses quantile regressions to measure the increased Value-at-Risk (VaR) of a financial system when an individual financial institute is distressed. Another inductive of systemic risk is the Co-Risk, which was first proposed in the IMF's 2009 Global Financial Stability Review (Chan-Lau *et al.*, 2009). It examines the co-dependence between the CDS (Credit Default Swaps) of various financial institutions. This approach uses quantile regressions like in CoVaR of Adrian and Brunnermeier (2016). Although it is considered a more informative approach

---

<sup>78</sup> Bisias *et al.* (2012) provide a list of systemic risk measures and their conceptual framework and taxonomy. They have also categorised these measures based on their approach and type of data needed from Macroeconomic measures to Granular and Network measures to stress testing, cross-sectional, and the measures of illiquidity and insolvency.

as it is a conditional risk measure, it provides a market assessment of the proportional increase in a firm's credit risk only and not total risk induced, directly and indirectly, from its links to other firms.

The relation expressed in this systemic risk model captures the market view of the rate at which declining asset values lead to equity falls when the market downfalls. It explicitly concentrates on interpreting the co-movement of this firm and the market, instead of serving as just a volatility measure of the firm's stock (Brownlees and Engle, 2017; Christoph and Christian, 2017). This intuition makes the SRISK estimated in this study a macroprudential measure of risk initiated or propagated by bank M&A announcements, and a micro-prudential measure when SRISK is calculated per firm and when SRISK is examined beside  $\Delta \beta$  and  $\beta^*$  in the previous section.

Therefore, SRISK is the capital that would be needed to achieve a market cap that is 8% of the book value of FI's assets in the event of distress. Distress is a decline of 40% in the FI's local industry index values over six months. Hence, the sequence of estimating SRISK starts with estimating capital shortfalls based on a) the assumptions of 40% decline of FI's local industry index in the following six-month period and b)  $\Delta \beta$  estimated in the previous section of systematic risk. The 40 per cent market decline is then decomposed over 125 working days to get the daily rate of decline. The resultant is then multiplied by the number of days in the event window, to reflect the duration of the event windows of CARs ( $40\% \div 125$  working days = 0.32%, then multiplied by, e.g. 11 where CAR(-5, +5)).

$$\mathbf{Long\ Run\ Marginal\ Capital\ Shortfall\ (LRMES) = 1 - \exp(\log(1 - d) * \Delta\beta)} \quad (4.5)$$

Systemic risk SRISK has LRMES as a component factor besides Quasi-Leverage *LVG* and prudential capital ratio *k*. Hence,

$$\mathbf{SRISK = Equity * [k * LVG + (1 - k) * LRMES - 1]} \quad (4.6)$$

Where  $k$  is the prudential capital fraction (5.5% for Europe, 8% elsewhere),  $Equity$  is the market value of equity (FIs), and  $LVG$  is quasi-leverage calculated using equation 7 below.

$$LVG = \frac{Assets_{Book\ Value} - Equity_{book\ Value} + Equity_{Market\ Value}}{Equity_{Market\ Value}} \quad (4.7)$$

Consecutively, SRISK can be represented as;

$$SRISK = k * (Assets_{Book\ Value} - Equity_{Book\ Value}) - (1 - k) * Equity_{Market\ Value} * \exp(\log(1 - d) * beta) \quad (4.8)$$

Where  $k$  is the prudential capital fraction (5.5% for Europe, 8% elsewhere),  $Equity$  is the market value of equity (FIs), and  $LVG$  is quasi-leverage, the book value of assets and equity and market value of equity. In a similar stepwise to the  $\Delta\beta$  calculation, changes in systemic risk are quantified by subtracting the systemic risk contribution of FIs after the merger announcement from those before the merger announcement, based on equity value and quasi-leverage in both periods respectively. Hence,

$$\Delta SRISK = SRISK_{after} - SRISK_{Before}$$

When the capital shortfall is negative, the FI has a capital surplus and can function properly. On the other hand, when this quantity is positive, the FI experiences distress. SRISK is higher for firms that are larger, more leveraged and with higher sensitivity to market declines. Note that, for simplicity, the dependence on the prudential ratio  $k$ , the threshold  $d$  and the time horizon is implicit in the SRISK notation.

For the analysis of target financial institutions reaction to merger announcements along with performance (exogenous and explanatory) variables, the measure of expected capital shortfalls

(LRMES) is measured along with SRISK. This is due to inconsistent equity market value data for targets after the merger (Acquisitions), which is a multiplier in the SRISK calculation.

#### **4.3.5 Sensitivity and Inference analysis**

Following micro- and macroprudential approaches a panel is constructed to examine the effect of bank mergers announcements on varying merits of:

**A) period:** short-term through CAR adjustments to the M&A announcement, medium-term through financial and operational and systemic risks, and the long run through examining capital shortfalls and SRISK in the medium range (0-6 months following an M&A) and one year after the announcement. This helps to create a pool of time-varying directly influencing variables, in an approach similar to the “*forward- $\Delta CoVar$* ” in Adrian and Brunnermeier (2016).

**B) nature of variables** and their influence in the shaping of the financial sector; contributing to formulating a prudential structure at both micro and macro levels through examining risk variation of effects/influence from/in:

##### **4.3.5.1 Regulatory variables**

Capital requirements - CAPRQ, under the regulatory paradigm, high capital provides more confidence to customers leading to an increase in spending and investments. These are examined beside the risk analysis and the capital shortfall measure to investigate the procyclicality effect of capital requirements (see Alfon *et al.* (2004) for UK market and Ayuso *et al.* (2004), Lindquist (2004), Fonseca and González (2010) and Stolz and Wedow (2011) for rest of Europe and the world). Especially with the growing literature on the negative impact of increased capital buffers (Basel 3) and their impact on available funds for lending (Hoening, 2018) that forms banks’ source of interest income and on operational, financial and system risks, consequentially, see Appendix A (Source:

Bank Regulation and Supervision Database, World Bank; Barth et al., 2001b, 2006, 2007b). Supervisory power – SPOWER; examines the strength of the regulator’s supervision power and their influence in the decision of mergers approvals. It is constructed using strength dummy scale variables. See Appendix A (Source: Bank Regulation and Supervision Database, World Bank; (Barth *et al.*, 2001a, 2008c;b). Activity restrictions – ACTRS, such as restrictions on real estate, insurance, and securities businesses. Also, to examine the impact and level of influence of such restrictions on the different decisions of varying M&A deals criteria. This variable goes in line with examining risk and capital shortfall on relative merits of deals criteria of focus vs diversification. See Appendix A for variable construction details (Source: Bank Regulation and Supervision Database, World Bank; (Barth *et al.*, 2001a, 2008c;b). Market discipline and private monitoring – PRMONT it highlights FIs internal procedures of corporate governance and accountability and measures for risk-taking and risk calculation. It is also vital for this study from the perspective of how an M&A deal can be considered a further risk-taking or a stabilising action decided by the FIs depending their focus vs diversifying orientation. See Appendix A for variable construction details (Source: Bank Regulation and Supervision Database, World Bank; (Barth *et al.*, 2001a, 2008c;b).

#### **4.3.5.2 Efficiency Variables**

In order to draw inferences on how different risk measures are synthesising with different measures of risk on the relative behaviour of strategic choices in bank mergers. These variables are the Malmquist (1953) index of Total Factor Productivity (TFPCH) along with its components on the efficiency frontiers of Scale efficiency (SECH), pure technical efficiency (PECH), technological efficiency (TECCH) and technical efficiency (EFFCH) (Worthington, 1999a). An additional efficiency measure which is crucial and closely related to the mergers literature is the operating profit per employee. This measure is similar to the notion of Return on Investment. It helps to provide more

informed insights on the real wealth creators in business; the knowledge, relationships, reputations, and other intangibles created by talented people and represented by investments in such activities as R&D, marketing, and training. Because mergers are naturally combining two or more business entities entailing staff and management remapping of structures and numbers, examining operating profit per employee and its adjustment to mergers and influence on/by risk becomes essential. Operating profit per employee *OPPE* is expressed as follows;

$$OPPE = \frac{\text{Trailing 12 – month Operating Income(Loss)}}{\text{Number of Employees}} \quad (4.9)$$

In this chapter’s panel, the above ratio is multiplied by 1,000,000, and the number of employees is adjusted for part-time staff to reflect the whole numbers of staff.

#### **4.3.5.3 Sustainability Growth**

Sustainability Growth Rate is tested to investigate the long-run success of bank mergers. A concept developed initially by Higgins (1977) and extended in 1981 to describe how much growth the firm can endure with no new debt capacity (Platt and Platt, 1995). In practical terms, the sustainable growth rate (SGR) is the maximum rate of growth that a firm can sustain without needing to surge financial leverage or look for outside financing. Seeking outside financing is an essential criterion in deciding how banks and other FIs can be risk-averse, mainly when being involved in a merger bidding to diversify products or markets. It is the product of FIs’ return on equity (ROE) and the percentage of its profits that are reinvested back into the firm. A slight modification was proposed by Ashta (2008). The leverage ratio should use the figures of the same date: it should use total opening

assets divided by opening equity<sup>79</sup>. This modification makes more intuitive sense since assets create sales and not the other way around. Therefore,

$$\text{SGR} = \text{Return on Equity} * (1 - \text{Dividend Payout Ratio}) \quad (4.10)$$

#### **4.3.5.4 Economic Value Addition**

Furthermore, the value creation of bank mergers is examined through analysing **Economic Value Addition (EVA)** which is a measure of financial performance based on the residual wealth, calculated by subtracting the cost of capital from operating profit and then adjusted for tax on cash basis. EVA can also be referred to as economic profit, as it attempts to capture the actual economic income of a company. This measure was developed by the management consulting firm “Stern Value Management” that is incorporated initially as Stern Stewart and Co and published in the Journal of Applied Corporate Finance (Stern *et al.*, 1995). EVA measures the wealth a company creates (or destroys) each year. It is a company’s after-tax profit from operations minus a charge for the cost of all capital employed to produce those profits – not just the cost of debt, but the cost of equity as well. EVA is the incremental change of return over a company's cost of capital. Mostly, it is used to measure the value a company generates from funds invested in it (Chen and Dodd, 1997). A negative EVA means the company is not generating value from the funds invested into the business. Conversely, a positive EVA shows that a company is producing value from the funds invested in it. Consequently, EVA would show how it supports or impair risk profile of acquiring banks and targets FIs. Hence,

$$\text{EVA} = \text{NOPAT} - (\text{IC} * \text{WACC}) \quad (4.11)$$

---

<sup>79</sup> Mathematically, this change would require modifying the asset turnover ratio to make it sales divided by opening total assets, instead of dividing by closing total assets as used by Higgins.

Where; NOPAT=Net Operating Profit After Taxes; Calculated by subtracting taxes from gross profit. IC=Invested Capital; the amount of capital invested, Total Assets - Current Liabilities. The WACC= average rate of return the firm projects to pay its investors; the weights/scales are resultant of a fraction of each financing source of the company's capital structure;

$$WACC = \frac{E}{V} * Re + \frac{D}{V} * Rd * (1 - Tc) \quad (12)$$

Where Re = cost of equity, Rd = cost of debt, E = market value of the firm's equity, D = market value of the firm's debt, V = E + D = total market value of the firm's financing (equity and debt), E/V = percentage of financing that is equity, D/V = percentage of financing that is debt and Tc = corporate tax rate.

A vector of deal characteristics is also constructed for every bank/merger in the panel. The panel itemises; deal size, mega-deal categorisation, and dummy variables representing mergers orientations following Ansoff (1957) matrix of product and market development. Precisely the dimensions of *a*) market penetration, i.e. focus deals, *b*) product development, i.e. bank remaining the same market but merging with no-bank FIs, *c*) market development, i.e. bank merging with another bank in a different jurisdiction and *d*) diversification, i.e. bank merging with a non-bank FI in a different jurisdiction (sometimes referred to as conglomeration). Dummy variables for diversification would be of value one because it would be market diversification which is 1 (0 otherwise) multiplied by one because the deal is also product diversification which is also 1 (0 otherwise).

During the financial crisis, financial institutions become under-capitalised and more vulnerable to external shocks. More importantly, they can become a source of these shocks via ordinary capital raising behaviour (Engle and Ruan, 2018). The SRISK and capital shortfall measure are examined, in addition to all the measures explained above, in an isolated panel for bank mergers deals that took

place during the financial crisis. That is the data set would include all bank mergers that were announced and completed between August 2007 and the end of August 2011.

#### **4.4 Summary Statistics**

The broadness of the sample makes the panel one of the most representative; a small number of observations are dropped due to lack of data, and this is reported in their relevant sections hereafter. **Table 4-1** and figure 4.1, show the summary statistics and their chronological, geographical and M&A deal type distributions. Between 1999 and 2017, there were 1236 bank merger and acquisition deals, with a value of USD 1.2 Trillion. The number of bank deals follows a steady increase from 1999 to mid-2007 (56 deals to 123 in 2006). Due to the financial crisis, by August 2007, bank M&As started a steep decline until the ending of 2011 with 28 deals only. The total number of deals that took place between August 2007 and August 2011 was 209 deals with a total value of USD 200 Billion.

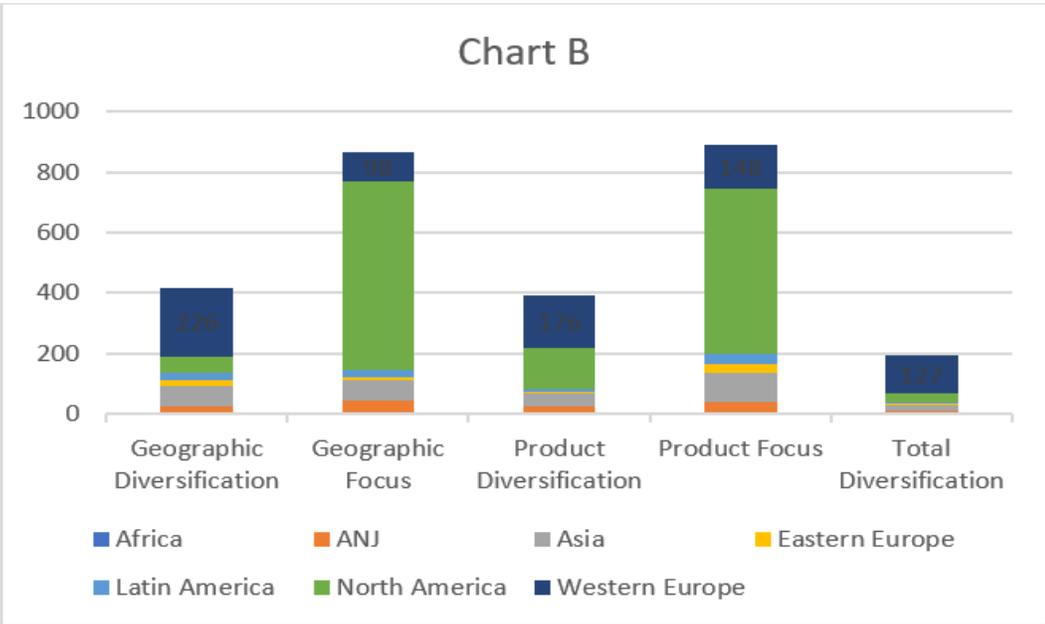
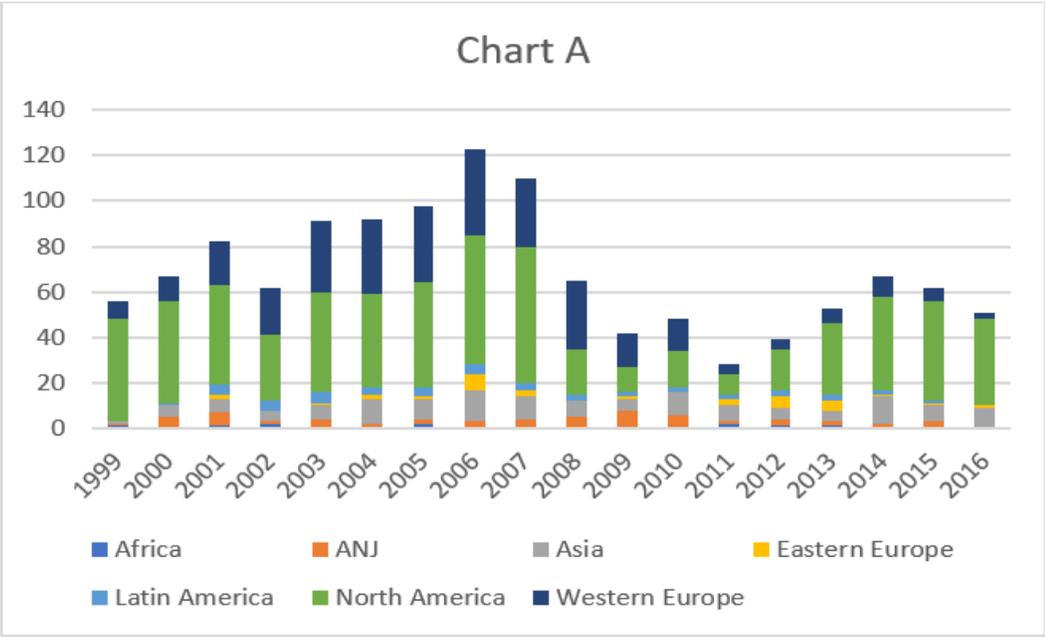
Table 4-1 Summary Statistics showing the number of bank merger deals distribution over years, regions, and Ansoff's Matrix categorisation of deal orientations.

	Africa		ANJ		Asia		Eastern Europe		Latin America		North America		Western Europe		Total	
	No.	Value \$US Millions	No.	Value \$US Millions	No.	Value \$US Millions	No.	Value \$US Millions	No.	Value \$US Millions	No.	Value \$US Millions	No.	Value \$US Millions	No.	Value \$US Millions
<b>Geographic Diversification</b>	5	2,777.66	21	19,321.46	67	36,695.14	22	9,943.49	22	21,430.39	55	74,978.11	226	233,201.32	418	404,573.73
<b>Geographic Focus</b>	5	1,227.64	39	104,661.47	67	57,949.95	10	12,203.08	24	13,217.30	625	538,112.04	98	298,971.33	868	960,572.80
<b>Product Diversification</b>	5	3,232.79	32	98,456.81	93	74,725.91	27	20,526.45	27	19,744.81	460	342,287.48	137	173,657.47	781	857,945.58
<b>Product Focus</b>	5	772.51	28	25,526.12	41	19,919.18	5	1,620.12	19	14,902.88	220	270,802.67	187	125,364.53	505	507,200.95
<b>Complete Diversification</b>	2	2,197.12	7	11,582.38	47	26,140.82	18	8,388.54	12	9,824.40	8	6,220.73	88	Western Europe	182	189,718.52
	Africa		ANJ		Asia		Eastern Europe		Latin America		North America		Western Europe		Total	
	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value	No.	Value
<b>1999</b>	1	62.39	1	536.31	1	50.33	0	0	0	0	45	45,156.05	8	54,546.16	56	100,351.24
<b>2000</b>	0	0	5	25,057.06	5	795.21	0	0	1	663.35	45	47,933.26	11	12,458.02	67	86,906.90
<b>2001</b>	1	120	6	5,344.12	6	16,585.95	2	527.49	4	1,351.82	44	24,455.08	19	19,411.40	82	67,795.86
<b>2002</b>	2	816.48	1	57.89	5	3,765.45	0	0	4	1,738.49	29	4,935.71	21	25,173.00	62	36,487.02
<b>2003</b>	0	0	4	5,411.58	6	1,788.56	1	357.18	5	1,266.37	44	60,684.75	31	16,976.75	91	86,485.19
<b>2004</b>	0	0	2	1,296.47	11	2,703.57	2	521.8	3	272.27	41	40,197.89	33	35,999.52	92	80,991.52
<b>2005</b>	2	189.16	2	29,993.11	9	2,419.58	1	50.88	4	982.86	46	12,164.26	34	50,783.29	98	96,583.14
<b>2006</b>	0	0	3	6,162.08	14	6,846.26	7	8,766.61	4	3,246.76	57	48,726.97	38	85,854.79	123	159,603.47
<b>2007</b>	0	0	4	3,863.61	10	3,739.40	3	338.96	3	610.97	60	58,474.10	30	79,399.91	110	146,426.95
<b>2008</b>	0	0	5	18,937.33	7	5,709.42	0	0	3	5,873.48	20	22,273.21	30	35,637.21	65	88,430.65
<b>2009</b>	0	0	8	5,396.56	5	2,226.56	1	243.2	2	802.37	11	8,928.72	15	7,834.23	42	25,431.64
<b>2010</b>	0	0	6	9,556.52	10	9,687.41	0	0	2	1,615.54	16	8,029.77	14	9,674.54	48	38,563.78
<b>2011</b>	2	610.85	1	129.12	7	1,697.82	3	1,952.02	2	1,855.80	9	7,250.20	4	2,951.63	28	16,447.44
<b>2012</b>	1	2,106.42	3	1,883.50	5	3,960.24	5	5,904.56	3	2,621.00	18	6,992.78	4	2,752.82	39	26,221.32
<b>2013</b>	1	100	2	5,556.81	5	1,504.03	4	2,767.89	3	4,558.30	31	9,636.70	7	2,343.78	53	26,467.51
<b>2014</b>	0	0	2	791.35	12	8,853.48	1	52.18	2	2,002.31	41	9,319.08	9	5,050.22	67	26,068.62
<b>2015</b>	0	0	3	2,323.21	7	7,195.80	1	53.65	1	5,186.00	44	16,456.25	6	3,356.92	62	34,571.83
<b>2016</b>	0	0	0	0	9	15,116.02	1	610.15	0	0	38	20,379.05	3	7,608.26	51	43,713.48
<b>Totals</b>	10	4,005.30	58	122,296.63	94	645.09	32	22,146.57	46	34,647.69	639	451,993.83	317	457,812.45	1236	1,187,547.56

This table provides the summary statistics showing number of bank merger deals over years and regions, and over regions and Ansoff's Matrix categorisation of deal orientations of geographic and product focus or diversification. Further, it reports the total diversification (product and market diversification) deals per region. Bank mergers in Western Europe dominates the value of deals compared to the rest of the world. However, north America (US majorly) dominates the number of mergers deals at 639 deals, with second greater to Western Europe at half the number of deals(317). Deals that are categorised as geographic focus are greater in number and in deal values than geographic diversification deals (Nearly double). While the opposite is true in product focus and diversification deals. Total Diversification (conglomeration) are not very popular with least of deals number and values among other strategic orientation mergers.

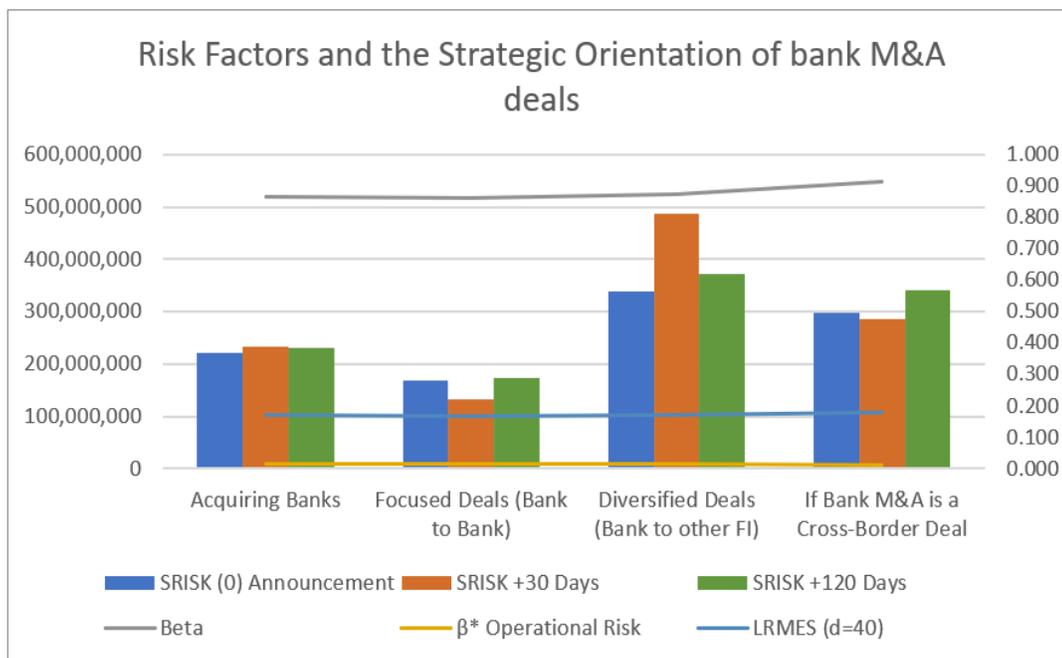
Around 34% of these deals are cross-border (i.e. geographic diversification), while 70.3% are local deals (i.e. geographic focus). On the other hand, 63.2% of bank M&As are product-focused (i.e. the merger is between two banks) and 40.8% are product diversifying deals where banks merge or acquire an FI that is in the insurance, real estate, or investment industries. Around 14.7% (182 deals) of all deals are total diversification, where a bank acquires or merge with FI that is in the insurance, real estate, or investment industries but operates in a different jurisdiction than the acquiring bank.

**Figure 4.1** shows that North America (the US specifically) along with Western Europe, continues to dominate the bank M&A transactions, followed by Asia. Interestingly, the shrinkage in the number of deals during the 2008-2011 financial crisis was not proportionate for those two regions compared to Asia and Eastern Europe. This observation is probably due to *i*) higher efficiency in these regions financial markets *ii*) the speed of transmission of risk and *iii*) due to the higher interconnectedness in the developed markets compared to the rest of the world. These reasons justify having the most significant impact of the crisis in these countries even though it originated in the US first. Theoretically, from the strategic orientation graph of **figure 4.1**, that diversification does not necessarily represent a risk, nor vice versa. Especially that this chart shows that the number of geographic diversification deals in North America (US) is the third-lowest, and for total diversification is only eight deals with a value of \$US 6.2 billion, yet the financial crisis originated in the US due to diversifying activities (real estate and securitisation) witnessed through the product diversification counting 460 deals and value \$US 342.3 billion.



**Figure 4-1 Regional / Continent and annual distribution of bank M&A announced and completed deals between 1999 and 1st quarter of 2017. Also, The regional distribution of the number of Bank M&A deals over the strategic orientation of the deal.**

**Figure 4.2** presents the overall averages (mean) of risk factors and their distributions over all acquiring banks, banks that have announced and completed an M&A deal with another bank (Focus), another financial institution and when the deal is cross-border. Namely, it illustrates the behaviour of *beta (before)* (systematic risk),  $\beta^*$  (operational risk), SRISK (Systemic Risk) upon the deal announcement and 30 days after the deal announcement and 30 days after the deal announcement. Focused deals appear to exhibit high levels of risk ( $\beta_{before}$ ,  $\beta^*$ , SRISK, SRISK+30) overall compared to diversified and cross-border deals. Notably, agreeing with diversification stability theory, diversified bank M&A deals exhibit 50% to 60% less SRISK compared to the focused ones. Furthermore, although systematic risk  $\beta$  remains below one on average for all deal types (low volatility) it is at its lowest for diversified deals, also emphasising diversification stability. This result motivates further examination of the impact and factors affecting risk in every deal type categorisation.



**Figure 4-2 Summarises the behaviour of Risk Factors and the Strategic Orientation of bank M&A deals and their behaviour in the effect of Target FIs line of business.**

## 4.5 Results

Due to the international aspect of the analysis and data being from various jurisdictions where accounting standards, standards of disclosure and reporting of balance sheet items are calculated and presented differently (Lai and Li, 2015), this chapter dissects the data presentation over regions and countries. A symmetrical set of data is presented to analyse risk measures of bank M&A deals that took place during the financial crisis between August 2007 and August 2011. Risk components of systematic ( $\Delta\beta$ ), operational ( $\beta^*$ ), capital shortfalls (LRMES) and systemic risk (SRISK) are examined in association with variables that can affect its initiation or propagation on the relative merits of the categories of Value (CAR and EVA), Regulatory and Market factors (CAPRQ, ACTRS, ECFR, Financial freedom, Concentration and Lerner Index), Size and Efficiency (Ln\_TASSETS, Operating Profit Per Employee, Operating Margin, Efficiency Ratio, EFFCH, TECHCH, PECH, SECH, TFPCH) and Sustainability and Profitability (SGR, ROA, Leverage and NOPAT)<sup>80</sup>.

The analysis hereafter differentiates between bank-level and system-level dissection of risks. That is, examining risk measures and determinants that are idiosyncratic to individual banks and

---

<sup>80</sup> CAR are cumulative abnormal returns, EVA are economic value addition, CAPRQ and ACTRS are regulatory capital requirements and activity restriction measures imposed by national regulators of every Jurisdiction. ECFR is the economic freedom index and Financial Freedom is the financial freedom index from the Heritage Foundation. Concentration is bank concentration, the level of concentration of the biggest five banks (assets) in every country, and Lerner Index measures the market power of a firm, expressed in  $P - MC/P$  where P represents the price of the good set by the firm and MC represents the firm's marginal cost. Ln\_TASSETS is the natural logarithm of total assets, Operating Profit Per Employee is the proportion of gross or operating profit to number of employees measured on the bases of working hours, Operating Margin is the operating profit margin, Efficiency Ratio measures bank efficiency ratio measures a bank's overhead as a percentage of its revenue. It's hypothesised that a ratio of 50% is the maximum optimal efficiency ratio. If the efficiency ratio increases, it means a bank's expenses are increasing or its revenues are decreasing. EFFCH, TECHCH, PECH, SECH, TFPCH are defined methodologically above, they are calculated using an output-oriented Malmquist Index Data Envelopment Technique, and then Indexed Matched to specific banks in their relevant years. SGR is sustainability growth rate, and as measures of profitability; ROA is return on assets, Leverage and NOPAT is Net Operating Profit After Tax.

financial firms in a micro-prudential analogy in section 4.5.1, followed by examining the macroprudential aspect in section 4.5.2.

#### **4.5.1 Systematic Risk ( $\Delta\beta$ and $\beta^*$ ) and Capital Shortfalls (LRMES)**

**Table 4-2** shows the summary statistics of the change in systemic risk  $\Delta\beta$ . Descriptive statistics show that, on average, systematic risk changes resulting from bank mergers in the United States, Canada, Australia, New Zealand and Japan are significantly different from zero. In both North America and ANJ regions, the systematic risk as a result of the merger announcement is considerably greater compared to those estimated in the period before the announcement. However, other regions do not appear to exhibit the same reaction towards bank merger systematic risk. Not necessarily due to the absence of an effect, but essentially due to the equal split of these regions' systematic risk profile between negative and positive effects. This can be seen from the Z statistics showing the multiple of standard deviations from the mean, and from the percentage of positive and negative observations.

Although the systematic risk manifestation in response to bank mergers vary in significance among different regions, mergers impact on  $\Delta\beta$  becomes consistent when subgrouping the sample into the market/product expansion strategies of these mergers. Product focus and diversification, geographic focus and diversification, conglomeration and all national deals (market penetration of product development) appear to all be affecting the systematic risk profiles of acquiring banks. It is, however, notable that, on average, crossborder and conglomerating deals are the least disruptive deals from the perspective of systematic risk (*Means=0.088 and 0.045 compared to 0.386 and 0.326 respectively*).

Table 4-2 Delta beta summary statistics.

Delta Beta of bank mergers statistics per region									
	Obs	Mean	t-statistics (Prob. Beta ≠0)	% Positive	Z-Statistics	% Negative	Std. Dev.	Min	Max
ANJ	54	0.5189123	<b>0.00001</b>	0.01%	3.8132	99.99%	0.415905	-0.35141	2.095018
Africa	10	0.0326228	<b>0.6423</b>	45.89%	0.1032	54.11%	0.214701	-0.30642	0.494549
Asia	129	0.0007769	<b>0.9188</b>	49.65%	0.0088	50.35%	0.086352	-0.21973	0.230234
Eastern Europe	32	-0.022058	<b>0.5005</b>	54.97%	-0.1248	45.03%	0.183056	-0.45987	0.464705
Latin America	45	-0.030355	<b>0.6784</b>	58.07%	-0.2036	41.93%	0.487751	-1.11439	1.495571
North America	677	0.5052718	<b>0.00001</b>	0.00%	13.1468	100.00%	0.283516	-0.51796	1.744434
Western Europe	323	-0.0030802	<b>0.7555</b>	52.21%	-0.0554	47.79%	0.177616	-0.4341	0.620054
Delta Beta of bank mergers statistics per geographic orientation of the deal									
Geographic Focus	857	0.3862458	<b>0.0001</b>	0.00%	11.3072	100.00%	0.342183	-1.11439	1.744434
Geographic Diversification (Cross border)	413	0.088226	<b>0.0479</b>	3.65%	1.793	96.35%	0.321908	-1.00768	2.095018
Delta Beta of bank mergers statistics per product orientation of the deal									
Product Focus	883	0.3295934	<b>0.0001</b>	0.00%	9.794	100.00%	0.371198	-1.11439	2.095018
Product Diversification	387	0.1974652	<b>0.0001</b>	0.01%	3.8846	99.99%	0.327687	-0.45987	1.36658
Delta Beta of bank mergers statistics when the deal is conglomeration or national									
Conglomeration	166	0.0455759	<b>0.0193</b>	0.96%	1.4992	99.04%	0.248419	-0.45987	0.875973
National deals	1,104	0.3259822	<b>0.0001</b>	0.00%	10.5523	100.00%	0.364003	-1.11439	2.095018

*This table presents a summary statistic of the variation in delta beta as a result of bank merger announcements in various regions and when the deal criteria of strategic allocation vary. ANJ refers to the bank mergers announced and completed for acquirers from Australia, New Zealand and Japan. Total number of deals (observations) in every categorisation is 1,270 deals). National deals refer to market development, product development and market penetration deals but not the deals that combine product and market development. The change of beta (after-before) is significantly different from zero for all merger strategic orientations of Geography and products expansion. Region wise, North America and ANJ groups show significant difference from zero for beta changes between after and before and merger announcements.*

**Table 4-3** shows that, overall, systematic risk change ( $\Delta\beta$ ), is associated with several regulatory, market-specific and institutional variables; however, with various levels and directions of significance. Beta changes are negatively associated with capital requirement (CAPRQ) and private monitoring (PRMONT), suggesting a positive role of these regulatory practices in decreasing systematic risk variations following a bank merger. However, activities restrictions and higher exertion of supervisory powers appear to increase systematic risk variations of bank mergers. These results support the diversification fragility hypothesis, accompanied by more of private monitoring than regulators and supervisors' power with higher capital requirements in place. Systematic risk reduction following a merger becomes prominent in markets with enhanced financial freedom, concentration and market power, but less economic freedom. This result advocates the ability of banks to sustain competitiveness to continue to generate income and make mergers successful, in opposition of higher competition and lower margins that lead to narrowing profits or narrowing the window of time that allows banks to benefit from the sought economies (*scale and scope*) as one of the merger objectives. Especially that financial freedom reflects activities permissible and encouraged in a jurisdiction, while economic freedom can be perceived as openness to competition from outside a financial system, implying an added risk of rivalry and externality.

Profitability achieved by higher leverage (debt to equity) contributes to decreasing systematic risk following a bank merger announcement. This is evident from the negative association of return on assets and leverage, although with relatively smaller magnitude with the latter. This outcome shows a positive role of debt contrasted to equity in achieving income, especially in the banking sector, because banks borrow capital for lending purposes instead of issuing equity to finance operations. This justification reflects a sound approach by banks, allowing them encouraging perception by targets and investors, leading to lower systematic risk.

**Table 4-3 The effect of bank M&As on bidding banks risks and the association with the regulatory, market and FIs factors.**

Delta Beta	Overall		Product Focus		Product Diversification		Geographic Focus		Geographic Diversification	
	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t
			Bank to Bank Merger		Bank to non-Bank Merger		Acquirer and Target operate in the same Country		Acquirer and Target operate in the different Countries	
<b>CAPRQ</b>	-0.067816***	0.000	-0.076298***	0.000	-0.051595**	0.061	-0.106011***	0.000	-0.012666	0.589
<b>PRMONT</b>	-0.017691	0.415	0.005003	0.857	-0.059670	0.144	0.008115	0.855	-0.070272***	0.050
<b>ACTRS</b>	0.019354	0.153	0.023827	0.178	0.023638	0.323	-0.005521	0.834	0.039155***	0.019
<b>SPOWER</b>	0.012754	0.437	0.023786	0.290	-0.016542	0.544	0.021694	0.471	0.004363	0.810
<b>Economic Freedom</b>	0.005919	0.169	0.011356***	0.042	0.003042	0.728	0.016067***	0.048	0.006234	0.275
<b>Financial Freedom</b>	-0.001188	0.309	-0.001556	0.273	-0.002430	0.333	-0.001376	0.368	0.000721	0.791
<b>Bank Concentration</b>	-0.005926***	0.001	-0.005469***	0.024	-0.005146**	0.065	-0.006239*	0.080	-0.001128	0.652
<b>Lerner Index</b>	-0.764599***	0.009	-0.880661***	0.023	-0.604801	0.220	-1.726047***	0.000	-0.323940	0.350
<b>TFPCH</b>	-0.010896	0.105	-0.011902	0.118	-0.002555	0.872	-0.014367***	0.043	0.022949	0.318
<b>EVA</b>	0.008201	0.133	0.010162*	0.089	-0.017540	0.285	0.009407	0.132	-0.011470	0.439
<b>SGR</b>	-0.000158	0.664	0.000382	0.695	-0.000220	0.585	-0.000077	0.844	-0.001458	0.281
<b>ROA (%)</b>	-0.077769***	0.034	-0.071527*	0.085	-0.114246	0.270	-0.088946***	0.043	-0.255781***	0.009
<b>Leverage</b>	-0.008554***	0.019	-0.007015	0.173	-0.013766***	0.046	-0.011665**	0.066	-0.015112***	0.005
<b>NOPAT</b>	-0.000002	0.195	-0.000001	0.397	-0.000010	0.316	0.000000	0.923	0.000005	0.177
<b>OPPE</b>	0.00000001	0.652	0.000000	0.494	0.000000	0.865	0.000000	0.299	0.000000	0.558
<b>Operating Margin</b>	-0.000348	0.703	0.000825	0.568	0.000234	0.927	0.000086	0.971	0.001523	0.231
<b>Efficiency Ratio</b>	0.000003	0.986	0.001909	0.263	0.000048	0.875	0.000161	0.941	-0.000095	0.599
<b>_cons</b>	0.860252	0.096	0.101314	0.884	1.478749	0.103	0.701889	0.545	0.249381	0.682
<b>No. of Obs</b>	475		369		106		404		71	
<b>Prob&gt;F</b>	0.0000		0.0000		0.0000		0.0000		0.0000	
<b>R-Squared</b>	0.3593		0.3203		0.5270		0.2458		0.5381	
<b>Adj. R-Squared</b>	0.2757		0.2809		0.2593		0.2801		0.2132	

*This table presents the effect of bank M&As on bidding banks risks; shows the level of association and its significance between acquiring banks' systematic risk  $\beta$  and regulatory, market and FIs factors. CAPRQ, PRMONT, ACTRS and SPOWER represents the proxies of regulatory regime towards capital requirement, monitoring, restrictions and supervisory power. Economic and Financial Freedom are Proxies for the financial sector freedom and the overall level of economic freedom. They are composite indices that are calculated by considering: business freedom, trade freedom, fiscal freedom, government spending, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, labour freedom. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. ROA (%) is the return on Assets. Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, mark-up). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries. Total Factor Productivity Change (TFPCH) is an index of efficiencies that is calculated by applying the ratio of differences on vectors of inputs and outputs. EVA represents the economic value addition or the enterprise value being an index based on the estimation of the Weighted Average Cost of Capital. SGR is the Sustainability Growth Rate. Leverage is the debt to equity ratio. NOPAT is the net operating profit after tax. OPPE is the Operating profit per employee OPPE, expressed as Operating Income(Loss)/(Number of Employees). Operating Margin Ratio measures a company's pricing strategy and operating efficiency, in percentage, is Operating Income (Losses) / Total Revenue \* 100. Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.*

#### **4.5.1.1 Systematic risk and merger geographic orientation**

Following the categorisation of bank deals over their geographic diversification strategies, **Table 4-3** also examines systematic risk adjustment following a merger announcement, and the factors and determinants influencing the change in beta ( $\Delta\beta$ ). Higher capital requirement appears to contribute significantly to decreasing systemic risk in all bank mergers where the target FIs (bank and non-bank) is in the same jurisdiction. The influence of capital requirements is similar in cross border deals, although not as significant (negative coefficient also but low probability). This result emphasises on, not only normalising of idiosyncratic risk effect of well-capitalised banks but also, its alleviating effect by decreasing risk materialised in declining beta after the merger. This is mainly attributed to the effect the capital requirement have on funds available for loans and funding riskier activities (Deli and Hasan, 2017a) to compensate for the cost of the merger, regardless of the geography.

Private monitoring also appears to play a significant role in decreasing systematic risk in the cross border mergers, but a very minimal insignificant increasing effect in national deals. The nature and the perceived risk of cross border deals are much higher compared to the local ones. Such assumption explains how private monitoring initiatives can be perceived as a cost that affects profit and financial efficiency in national deals, but a risk-limiting and early detection alarm for underperformance in cross border deals. This result supports the munificent escape-from-costly-regulations or bonding views of regulatory arbitrage (Karolyi and Taboada, 2015b); in which cross-border bank acquisition streams involve acquirers from countries with stronger supervision, sterner (high) capital requirements, more restrictions on bank activities, and stronger private monitoring than those of their targets primarily.

Activity restrictions are negatively associated with beta in national/local deals but positive with cross-border deals. It is reflecting the stabilising effect of activity restrictions imposed by regulators

in national bank mergers. However, these same restrictions push banks to engage in relatively riskier mergers across the border. Opposite to economic freedom, financial freedom follows the same regime in decreasing bank risk in local markets and increasing it in cross-border ones. Bank concentration exhibits a negative effect on beta in both local and cross-border deals. However insignificant, bank concentration; a fewer number of banks in a specific market contribute to decreasing moral hazards due to enhanced availability of information on customers profiles and abilities (Allen and Gale, 2004; Gropp *et al.*, 2011; Vives, 2011). Lerner Index that is a measure of market power in the banking market; compares output pricing and marginal costs (that is, mark-up), also associates with decreasing systematic risk in national deals. An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries, a result that aligns with results on concentration. Connectedly, bank size appears to have a negative and significant impact on systematic risk in national bank mergers, but not in cross-border ones, justifying a similar behaviour pertaining to concentration, competition and moral hazard in relation to bank risk (Beck *et al.*, 2006; Demsetz and Strahan, 1997; Irresberger *et al.*, 2016).

A positive productivity change significantly decreases systematic risk exposure for national bank mergers. This is evident from the strong opposing association of total factor productivity change (TFCH) with beta change. Profitability, measured by return on assets, supports the theory of consolidation stability; both local and cross border. ROA contributes to decreasing systematic risk in both geographic focus and diversification. Such results are perceived as normal because enhanced performance would inevitably mean better preparedness to reap efficiency enhancements and to control for and mitigate risks. Leverage also exhibits a significant negative relationship with systematic risk in cross-border and in local deals. That is, when beta increases for cross-border deals leverage decrease, resembling either more reliance on retained earnings or shareholders equity to fund cross-border deals or higher reluctance in the market to lend banks engaged in cross-border mergers.

Considering the negative association with EVA in cross border deals, which is a function of net operating profit after tax, the earlier is more likely. Systematic risk is significantly associated with payment type when the deal is geographic diversification but not when it is 'same jurisdiction deal'. This association is negative, reflecting the preference for cash and cash equivalent payments and less motivation for debt and mixture of debt and stocks. It is understandable from a risk perspective, especially when considering foreign exchange risks and the expectation of fluctuations during the deal settlement and completion (Berger *et al.*, 2013; Beck *et al.*, 2006). Furthermore,  $\Delta$  beta is positively associated with product focus when the deal is cross-border. This notation reflects the geographic diversification fragility theory at the acquiring bank level. It is naturally due to several factors that are a) idiosyncratic to the acquirer and target FIs like size, line of business and performance, and b) market-related and environment factors like business language and culture differences, regulatory, economic and social norms (Casu *et al.*, 2015; Berger *et al.*, 2013; Beck *et al.*, 2006).

The operational risk component of beta does not significantly change the effect from the above-explained determinants, except for the expected similar resemblance of payment type in national bank mergers. Capital shortfalls, calculated by long-run marginally expected shortfalls at 40% of equity value, correspond with results on beta association with all of regulatory and performance variables. This proportionate resemblance proves the alliance of capital shortfalls LRMES on bank's systematic risk of beta.

#### **4.5.1.2 Systematic risk and merger's activity orientation**

On the relative merits of bank mergers product orientation, **Table 4-3** emphasises the effect of market powers, and performance indices on banks systematic risk and capital shortfalls, under both paradigms of 'bank to bank' mergers and 'bank to other non-bank FIs' mergers.

Capital requirements have the same risk reduction effect witnessed in the analysis of the geographic orientation categorisation of mergers. Hence, CAPRQ continues to present the assurance factor of merger success, or at least risk avoidance, in all strategic setups of bank mergers. This is attributed to the role of the capital in banks operations and reserves (buffers) towards future losses.

Economic freedom appears to influence systematic risk in a positive and significant manner. However, financial freedom does the opposite. This result explains that, with higher financial freedom limited by an increasing concentration and market power (Lerner Index), i.e. fewer players in the market, systematic risk can be limited and decreased despite the openness of the general economy and its freedom. This mechanism is best described through the positive impact of competition (Boyd and De Nicoló, 2005; De Nicoló and Lucchetta, 2009) and adverse selection and moral hazard limitation, during a product launch, through more available and concrete client information in relatively high concentration markets (Beck *et al.*, 2006; Fiordelisi and Mare, 2014). Connectedly, the higher concentration would stem from the fact that these mergers are bank to bank, hence decreasing the number of operating banks and competition, especially in national or regional mergers (Schaeck and Cihák, 2014; Jiménez *et al.*, 2013; Schaeck *et al.*, 2009; Beck *et al.*, 2006; Laeven *et al.*, 2016; Barth *et al.*, 2013b; Laeven and Levine, 2007; Allen and Gale, 2004). Different product diversifying deals appear to be indifferent to the rest of regulatory factors; private monitoring, activity restrictions and supervisory powers. This probably reflects that existential paradigm that if the assurance of capital requirements exists, activities permissibility or restriction become less infuriating. Furthermore, with such assurance, even regulators would be less anxious to exert power or to chase for private monitoring (Brun *et al.*, 2013; Heid, 2007; Repullo, 2004). This resolution does not correspond much with recent boundaries drawn by regulators pertaining to ring-fencing and activities restrictions. Hence not necessarily promoting diversification stability, though not predominantly accepting diversification fragility (Laeven *et al.*, 2016; Barth *et al.*, 2013b).

The operational risk component of systematic risk,  $\beta^*$ , shows one peculiar behaviour from beta in its negative association with payment in bank-to-bank deals. This outcome reflects the risk-lowering effect of payments made for the merger deal, that is cash or cash equivalents, and more specifically in this case, when the funds are from banks operating profits and not from borrowing or exogenous leveraging (Detken *et al.*, 2018; Fiordelisi and Mare, 2014).

Examining bank mergers conglomeration effect on systematic risk, with factors of the market, regulation and performance in the years around the merger year, informs a description of motivation, actual effects and results of the mergers. **Table 4-4** shows the association of banks, market and regulatory factors with delta beta and capital shortfalls measured Long Run Marginal Expected Shortfalls in Panel A, and delta beta association with performance factors pre-merger and post-merger in panel B.

Results show that bank mergers pursuing conglomeration, via acquiring other non-banks across the borders, are less prone to systematic risk when they can target economic value enhancement. EVA represents the enterprise value and is an index based on net operating profit after tax and on the estimation of the Weighted Average Cost of Capital. Therefore, the enterprise value can be enhanced in cross border merger by adopting operations and promote products that are highly cost-effective; operationally and financially. This value addition and cost-effectiveness can be accomplished by fundamentally simplifying products, services, and the underlying processes. Because old products and services need not be eliminated when new ones are introduced, banks tend to build up sizeable portfolios of closely associated offerings. And most sell and support them through a wide variety of channels, with separate underlying processes. This costly complication does not necessarily come with the merger nor is recent, but it is especially problematic now because it impedes digitisation and shifting towards the FinTech wave. Before banks can become digital and become able to realise the benefits, they must lessen the variety of products and services proffered.

**Table 4-4 Bank Mergers and conglomeration; systematic risk and Long-Run Marginal Expected Shortfall**

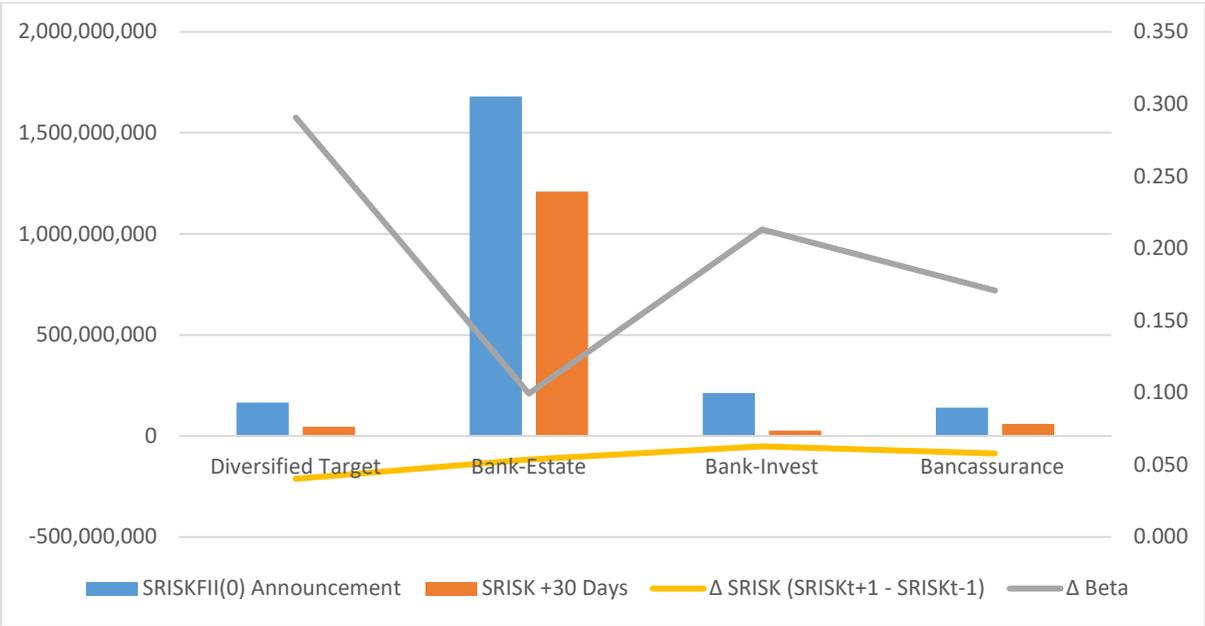
Panel A					Panel B					
	Delta Beta		LRMES40			Delta Beta				
	Coef.	P> t	Coef.	P> t		Coef.	P> t			
CAPRQ	-0.088636	0.340	-0.013847	0.331	Pre-Merger Performance	EVA (1 Yr Pre)	-0.001686	0.960	No. of Obs 36 Prob>F 0.0001 R-Squared 0.5804 Root MSE 0.24174	
PRMONT	-0.273439	0.144	-0.036393	0.201		SGR (1 Yr Pre)	-0.000969	0.419		
ACTRS	0.089540	0.398	-0.033203**	0.053		ROA (%) (1 Yr Pre)	-0.115227	0.487		
SPOWER	-0.032456	0.618	-0.029640***	0.008		Leverage (1 Yr Pre)	-0.037939***	0.000		
ECONOMIC FREEDOM	-0.007519	0.726	0.001700	0.606		NOPAT (1 Yr Pre)	-0.000015	0.518		
Financial Freedom	0.009709	0.341	-0.001378	0.377		Operating Profit Per Employee (1 Yr Pre)	0.000000	0.659		
Bank Concentration(5)	-0.001899	0.857	-0.002807*	0.097		Operating Margin (1 Yr Pre)	0.007528***	0.020		
Lerner Index	-0.009377	0.995	0.184764	0.467		Efficiency Ratio (1 Yr Pre)	0.001911	0.632		
TFPCH	-0.007059	0.884	0.004111	0.582		_cons	0.657742	0.226		
EVA	-0.159111**	0.069	-0.017279	0.185		Post-Merger Performance	EVA (1 Yr Post)	0.045817***		0.033
SGR	0.010719	0.416	0.004110**	0.054			SGR (1 Yr Post)	0.001482		0.775
ROA (%)	0.290324	0.501	0.115235*	0.095			ROA (%) (1 Yr Post)	-0.200029***		0.046
Leverage	0.000692	0.983	0.006449	0.200			Leverage (1 Yr Post)	-0.018126***		0.005
NOPAT	-0.000051	0.362	-0.000021***	0.025			NOPAT (1 Yr Post)	-0.000016		0.142
OPPE	0.000000	0.740	0.000000	0.156			Operating Profit Per Employee (1 Yr Post)	0.000000		0.897
Operating Margin	0.002470	0.703	-0.001927**	0.067			Operating Margin (1 Yr Post)	0.000819		0.330
Efficiency Ratio	-0.000093	0.889	0.000229***	0.038			Efficiency Ratio (1 Yr Post)	-0.000086		0.629
_cons	0.890311	0.751	0.899691	0.050			_cons	0.836907		0.000
No. of Obs	33*18		33*18							
Prob>F	0.1625		0.0049							
R-Squared	0.654		0.819							

This table differentiates between the effects and factors of bank mergers conglomeration (Total Diversification of geography and products) on risks contribution, by showing the level of association and its significance between acquiring banks' systematic risk  $\beta$  and capital shortfalls (LRMES) analysing regulatory profiles, market factors and performance in the years before, after and during the merger announcement years. CAPRQ, PRMONT, ACTRS and SPOWER represents the proxies of regulatory regime towards capital requirement, monitoring, restrictions and supervisory power. Economic and Financial Freedom are Proxies for the financial sector freedom and the overall level of economic freedom. They are composite indices that are calculated by considering: business freedom, trade freedom, fiscal freedom, government spending, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, labour freedom. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. ROA (%) is the return on Assets. Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, mark-up). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries. Total Factor Productivity Change (TFPCH) is an index of efficiencies that is calculated by applying the ratio of differences on vectors of inputs and outputs. EVA represents the economic value addition or the enterprise value being an index based on the estimation of the Weighted Average Cost of Capital. SGR is the Sustainability Growth Rate. Leverage is the debt to equity ratio. NOPAT is the net operating profit after tax. OPPE is the Operating profit per employee OPPE, expressed as Operating Income(Loss)/(Number of Employees). Operating Margin Ratio measures a company's pricing strategy and operating efficiency, in percentage, is Operating Income (Losses) / Total Revenue \* 100. Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.

Customers rarely miss those that are abolished, because their functions are usually available in the remaining set of offerings. Furthermore, banks should pursue low-cost organic growth. Banks often grow at the expense of profit margins. This tactic is unsustainable, particularly for incumbents in mature markets, where additional market share is likely to come with higher customer acquisition costs and reduced customer quality. Banks must attempt building scalable platforms on which unit costs automatically fall as volume rises, the conventional business model in the digital space. Further, banks should pursue cutting costs progressively through continuous review of cost centres, such as the middle office, support functions, and IT, that are being reinforced by the growth of regulation. Therefore, banks can use M&As to build scale. Process automation is increasing the fraction of banks' costs that are fixed, as is the mounting cost of compliance and risk management. Rising fixed costs, in turn, increases the significance of scale in banking and makes M&As attractive prospects for banks with limited opportunities for rapid organic growth (national bank-bank deals). This is emphasised on in panel B of Table 4-4 that shows how leverage and operating margin (not NOPAT) of the year before the merger announcement are associated with decreasing and increasing systematic risk, respectively. Furthermore, leverage and profitability (ROA) combine efforts in the years following mergers to bring the systematic risk down, but when systematic risk following a merger are high, they do contribute to increasing enterprise value (economic value addition). Probably through diversification of activities that enhance income and through technologies adoption.

### 4.5.2 Systemic Risk (SRISK)

Following the micro-prudential level of analysis of systematic risks and capital shortfalls, the risk is tested at the macroprudential through factoring Systemic Risk (SRISK) in response to bank mergers and acquisitions, and in association with other micro- and macroeconomic and regulatory variables.



**Figure 4-3 Risk Factors and Target FI's line of business; upon announcement and 30 and 120 days after the announcement.**

**Figure 4-3** shows a decomposition of risk over the different types of Target FIs. It shows that, if the target is already a diversified institution, systematic risk ( $\Delta\beta$ ) is at its highest magnitude with an average of 0.291 change between post and pre-announcement betas. However, the largest reduction ( $\Delta$ SRISK) is in bank-diversified targets deals, systemic risk SRISK upon announcement and 30 days after the announcement is very low for diversified targets compared to M&As with other

targets deals. Probably due to investors perception (worry) of extreme diversification and business losing identity and competitive advantage which are idiosyncratic (systematic) undiversified factors, while equity value and quasi-leverage, that form the variable components of systemic risk, along with capital shortfalls are at good standards when the deal goes for further diversification. Bank-Investment and bancassurance deals portray a similar pattern to bank-diversified target deals. However, the opposite is true for bank – real estate deals. They appear to exhibit the least systematic risk ( $\Delta\beta$ ) but the highest systemic risk (SRISK). Perhaps due to the pre-existing experience of banks in investment banking and insurance, and due to their capability to mitigate risk through securitisation into other unconnected sectors or industries. An area that is not extensively explored in the literature is that target FI could be more than an insurance company, investment banking or a real estate company; they can be bank doing one or more of those businesses. Hence, the merger deal can be focused, because it is bank to bank categorised, but in effect, the acquiring or merging bank is indirectly getting involved and will be conducting other business than pure commercial banking. Figure 4-3 shows how markets and investors perceive such deals and affect their evaluation of the individual and merging stocks. Thus, having an impact on market value and, at a later stage, on systemic risk, that reflects higher risk perception than deals with pure investment, insurance or real estate firms. This is not the case in Bank-Estate mergers where banks become more capable at the firm level due to higher capitals injections with such deals (Larger Assets base), but the reputation left from mortgage bubbles and the latest sub-prime crisis have affected the systemic risk contribution of such deals. Table 4-5 explores the differences of contributory factors to systemic risk changes in bank mergers between the two regions that witnessed the highest number of bank mergers in the last two decades with the highest values of transactions, besides the overall associations. Evaluations are made using linear and robust regressions to adjust for autocorrelation, multicollinearity and homoscedasticity.

*Table 4-5 Systemic risk variations and its contributing factors; North America vs Western Europe.*

Delta SRISK	Overall		North America		North America		Western Europe		Western Europe	
	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t
CAPRQ	10,000,000***	0.000	152000000***	0.000	152,000,000***	0.000	-2,398,890***	0.006	-2,398,890***	0.002
PRMONT	7,071,009***	0.036	293000000***	0.000	293,000,000***	0.000	-8,871,663***	0.000	-8,871,663***	0.000
ACTRS	3,763,857***	0.003	-335000000***	0.000	-335000000***	0.000	13,900,000***	0.000	13,900,000***	0.000
SPOWER	-7,304,669***	0.000	(omitted; adjusting for Multicollinearity)		(omitted; adjusting for Multicollinearity)		6,690,831***	0.000	6,690,831***	0.000
ECONOMIC FREEDOM	619,455.30	0.382	164000000***	0.000	16,400,000***	0.000	-894,914***	0.000	-894,914***	0.000
Financial Freedom	58078.59	0.855	-1663388***	0.005	-1,663,388***	0.019	960,085.30***	0.000	960,085.30***	0.000
Bank Concentration(5)	-198776.40	0.222	-6871073***	0.000	-6,871,073***	0.000	239,299.90	0.102	239,299.90***	0.000
Lerner Index	397000000***	0.000	648000000***	0.000	648,000,000***	0.000	-151,000,000***	0.000	-151,000,000***	0.000
TFPCH	-7024361***	0.000	-7763654***	0.000	-7,763,654***	0.000	2,149,004***	0.004	2,149,004***	0.000
EVA	-8041845***	0.000	-7043628***	0.000	-7,043,628***	0.000	1,371,501	0.255	1,371,501***	0.067
SGR	9293.09	0.477	-45924.32	0.377	-45,924.32***	0.000	-470,377.90***	0.000	-470,377.90***	0.000
ROA (%)	-41300000***	0.000	-35700000***	0.000	-35,700,000***	0.000	-17,400,000***	0.000	-17,400,000***	0.000
Leverage	-4686483***	0.000	-9567011***	0.000	-9567011***	0.000	-1,085,888***	0.000	-1,085,888***	0.000
NOPAT	61.93	0.772	1059.99	0.102	1059.99***	0.026	398.35	0.342	398.35	0.184
OPPE	8.11***	0.005	-411.08***	0.000	-411.08***	0.000	-34.55***	0.000	-34.55***	0.000
Operating Margin	1107865***	0.000	2017846***	0.000	2017846***	0.000	612711.90***	0.000	612,711.90***	0.000
Efficiency Ratio	-103007.90***	0.000	-246559.30	0.476	-246559.30	0.213	-55448.76***	0.000	-55,448.76***	0.000
cons	-78500000.00	0.221	777000000.00	0.099	777000000.00	0.082	-42900000.00	0.160	-42900000.00	0.003
No. of Obs	26,738		No. of Obs	24,053	No. of Obs	24,053	No. of Obs	1954	No. of Obs	1954
Prob>F	0.0000		Prob>F	0.0000	Prob>F	0.0000	Prob>F	0.0000	Prob>F	0.0000
R-Squared	0.2070		R-Squared	0.2070	R-Squared	0.2700	R-Squared	0.2521	R-Squared	0.2521
Root MSE	290,000,000		Root MSE	0.2640	Adj. R-Squared	300,000,000	Adj. R-Squared	0.2455	Adj. R-Squared	28,000,000

*This table differentiates between the effects and factors of bank mergers announced in the two significant regions of North America (US) and Western Europe Systemic Risk. CAPRQ, PRMONT, ACTRS and SPOWER represents the proxies of regulatory regime towards capital requirement, monitoring, restrictions and supervisory power. Economic and Financial Freedom are Proxies for the financial sector freedom and the overall level of economic freedom. They are composite indices that are calculated by considering: business freedom, trade freedom, fiscal freedom, government spending, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, labour freedom. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. ROA (%) is the return on Assets. Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, mark-up). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries. Total Factor Productivity Change (TFPCH) is an index of efficiencies that is calculated by applying the ratio of differences on vectors of inputs and outputs. EVA represents the economic value addition or the enterprise value being an index based on the estimation of the Weighted Average Cost of Capital. SGR is the Sustainability Growth Rate. Leverage is the debt to equity ratio. NOPAT is the net operating profit after tax. OPPE is the Operating profit per employee OPPE, expressed as Operating Income(Loss)/(Number of Employees. Operating Margin Ratio measures a company's pricing strategy and operating efficiency, in percentage, is Operating Income (Losses) / Total Revenue \* 100. Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.*

Results show that among the regulatory variables, only supervisory power affects reducing systemic risk in the post-merger period compared to the pre-merger period. On the contrary, jurisdictions with high capital requirements, stricter activities restrictions and private monitoring approach contributes to increasing systemic risk after merger announcement compared to the pre-merger announcement. The same applies to economic and financial freedom, although non-significantly. This result diverges from the analysis provided on systematic risk ( $\beta$ ), again proving the deviation between systematic risk which is banks idiosyncratic undiversified risk and banks contribution to systemic risk with its equity value and capital shortfalls being part of this contribution. These results also vary among the North America and Western Europe regions reflecting the different regulatory approach towards banks in general and towards consolidations and activities permeability in specific. For instance, capital requirement and private monitoring are perceived as contributors to decreasing risk in Western Europe for their assurance and discipline features but perceived the opposite way in North America for their cost and pressure on available funds for lending and financing income-generating activities (Ketteni and Kottaridi, 2019; Ayadi, 2019; Lerskullawat, 2017). The same is also true for economic and financial freedom. Bank concentration and market share exhibit straying results too among those two regions. The immediate justification relates directly to the structure of ownership and markets in addition to regulatory differences in those two regions, especially in relation to the federal system and intrastate mergers in the US in comparison to the jurisdiction level regulation under guidance from the European Central Bank.

#### **4.5.2.1 Systemic risk and geographic diversification**

Examining the factors affecting how systemic risk contributes to bank mergers at relative merits of geographic diversification, results reveal divergence between national and cross border deals. For instance, the greater the deal value, the lower the contribution to systemic risk a bank merger would cause if merging with FIs in local markets. The opposite is true with cross border deals. The larger the deal value, the greater the contribution of systemic risk in the acquirer's country. This result confirms the perceived greater risk when going cross border with a bigger deal value compared to local deals where the risks coming from adaptation to legal, political, regulatory and social differences are not present. A similar reaction of SRISK contribution pertaining to the geographic diversification factors is recorded against supervisory power and economic freedom towards decreasing systemic risk contributions. Explaining the role of these control factors in decreasing systemic risk in local deals, but they appear as impediments of performance and expansion of operations in the cross-border deals. That is, the increased financial freedom that allows mergers with activity diversification attributes, and lower requirements on capital ratios support system stability and pose fewer threats to the banking sector and require fewer funds allocation for the contingencies of system-wide crisis. Higher capital requirements, bigger emphasise on private monitoring, and greater activities restrictions become all hindrances to performance due to their costs and impact on other diversification initiatives. Hence, contributing to increasing systemic risk contributions in both local and cross border deals (Lindquist, 2004; Repullo, 2004; Weiß *et al.*, 2014). Increased bank concentration and market power (Lerner Index) seem to increase systemic risk contribution as well. Probably to the same performance impeding feature of these market conditions, that proves that entering any market, local or across the borders, can become more challenging with high market powers of existing rivals and higher concentration where the biggest five firms control the majority of the target market (Demirgüç-Kunt and Detragiache, 2010).

**Table 4-6 Local and cross border FIs mergers effect on systemic risk and the associated factors.**

<b>Delta SRISK</b>	<b>Geographic Diversification Bank Merger Orientation</b>		<b>Geographic Focus Bank Merger Orientation</b>	
	<b>Coef.</b>	<b>P&gt; t </b>	<b>Coef.</b>	<b>P&gt; t </b>
<b>Deal Value</b>	-2,546.157***	0.000	3,587.68***	0.000
<b>CAPRQ</b>	11,600,000.00***	0.000	34,900,000.00***	0.000
<b>PRMONT</b>	1,885,812.00	0.148	59,200,000.00***	0.000
<b>ACTRS</b>	7,006,565.00***	0.000	5,849,216.00***	0.000
<b>SPOWER</b>	-182,896.40	0.798	6,650,480.00***	0.000
<b>ECONOMIC FREEDOM</b>	-3,037,730.00***	0.000	6,159,880.00***	0.000
<b>Financial Freedom</b>	448,272.90***	0.000	- 844,758.40***	0.038
<b>Bank Concentration(5)</b>	319,286.10***	0.003	1,343,669.00***	0.000
<b>Lerner Index</b>	15,800,000.00	0.243	823,000,000.00***	0.000
<b>TFPCH</b>	-955,447.70	0.124	- 6,919,785.00***	0.000
<b>EVA</b>	-1,433,467.00***	0.005	- 7,671,509.00***	0.000
<b>SGR</b>	-51,358.10	0.310	- 33,129.54***	0.000
<b>ROA (%)</b>	-4,228,223.00	0.317	- 43,200,000.00***	0.000
<b>Leverage</b>	-1,575,151.00***	0.000	- 7,893,831.00***	0.000
<b>NOPAT</b>	-3,882.63***	0.000	- 6,905.99***	0.000
<b>OPPE</b>	36.51***	0.000	- 64.02***	0.000
<b>Operating Margin</b>	365,090.10***	0.000	1,915,207.00***	0.000
<b>Efficiency Ratio</b>	6,009.27	0.567	266,878.00***	0.005
<b>cons</b>	38,200,000.00	0.122	- 1,140,000,000.00	0.000
<b>No. of Obs</b>	<b>368</b>		<b>65</b>	
<b>Prob&gt;F</b>	<b>0.0001</b>		<b>0.0320</b>	
<b>R-Squared</b>	<b>0.5642</b>		<b>0.3542</b>	
<b>Root MSE</b>	<b>43,000,000.00</b>		<b>300,000,000.00</b>	

*This table shows the effect of geographically diversifying mergers and the associating regulatory, market and performance factors on systemic risk contributions. CAPRQ, PRMONT, ACTRS and SPOWER represents the proxies of regulatory regime towards capital requirement, monitoring, restrictions and supervisory power. Economic and Financial Freedom are Proxies for the financial sector freedom and the overall level of economic freedom. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. ROA (%) is the return on Assets. Lerner Index is a measure of market power in the banking market. Total Factor Productivity Change (TFPCH) is an index of efficiencies that is calculated by applying the ratio of differences on vectors of inputs and outputs. EVA represents the economic value addition or the enterprise value. SGR is the Sustainability Growth Rate. Leverage is the debt to equity ratio. NOPAT is the net operating profit after tax. OPPE is the Operating profit per employee, expressed as Operating Income(Loss)/(Number of Employees). Operating Margin Ratio measures a company's pricing strategy and operating efficiency, in percentage, is Operating Income (Losses) / Total Revenue \* 100. Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.*

Divergent from the market and regulatory factors, performance factors of productivity change, economic value addition, sustainability growth rate, return on assets, leverage and net operating profit after tax appear to all have a positive effect on decreasing systemic risk contribution of bank mergers in both local and cross-border transactions. This result emerges naturally considering the impact on firms resilience a financial performance of a firm, combined with economic and enterprise value

(EVA and SGR) addition policy, can have on being less idiosyncratically risky and less contributing to systemic risk (Amihud *et al.*, 2002; De Nicoló and Lucchetta, 2009; Deng and Elyasiani, 2008). Pursuing higher operating profit per employee is recognised positively by cross border mergers for its risk contribution, while negatively in local deals. Considering the efficiency ration and operating margin association with systemic risk, it can be analysed that mergers aiming at the economic value and after-tax profitability can have more sustainable profits that can contribute to less systematic and systemic risks. Furthermore, cross-border deals have an inherent nature of significant influence in target systems than local ones due to expectations of cash flow volatility following the merger (Furfine and Rosen, 2011).

#### **4.5.2.2 Systemic risk and FIs targets**

Larger deal values lead to increasing systemic risk contribution in both products focusing and diversifying bank mergers. However, this contribution is more significant inn product diversification, considering the magnitude of deal values and the number of deals compared to the focusing ones. Majorly attributed to the apparent riskiness of larger deals. This result is consistent for all types of target financial institutions except bancassurance mergers, where larger deals lead to less systemic risk contribution. Positive gains and no significant risk shifts for shareholders of bidding banks (Fields *et al.*, 2007) are the main reasons for immunity towards systemic risk changes. Chen and Tan (2011) also provide evidence, that acquiring banks' total risks remain constant following bank-insurance mergers, especially due to having no changes for the systematic risks (beta) and the positive wealth effects that are documented.

Capital requirements and private monitoring appear to be impediments of performance and growth in product focusing deals (Bank-Bank) mergers, like the mergers that are national. While CAPRQ seems to ease the systemic risk generating from product diversifying deals, private

monitoring can be viewed as a un-feasible cost, essentially attributed to bank-real estate deals, probably due to the fact the targets here are firms with heavy assets base (real estate) which can signal the stability of the merger as a whole. Activity restrictions affect systemic risk addition on acquiring banks in all product orientations, with significance on such impact towards real estate targets, probably attributed to the effect the subprime crisis and mortgage bubble have on such mergers. The effect of the subprime crisis is investigated in section 4.5.3 below. Supervisory power contributes to less systemic risk in product focusing deals but less significantly diversifying ones with the opposite influence. Bank-real estate mergers are major effects here too. Such results could reflect the effect supervisory powers can have in product-focused deals and the role of regulators, while this role diminishes or get distracted with mergers in different industries where supervision becomes more complicated and intricate (Kremers *et al.*, 2003).

Economic and Financial freedom affects systemic risk post bank mergers differently. Economic freedom decreases systemic in product diversification deals with main influence in bank-real estate mergers. The opposite is true for financial freedom and product focus bank mergers. Although economic freedom is essential for all economic sectors that ensure funds for banks, financial freedom can be perceived as risk promoting due to its impact on permissibility of diversified investments and expansion through merging and branching (Hirtle and Stiroh, 2007; Demyanyk *et al.*, 2007a; Deng and Elyasiani, 2008).

Bank concentration and market power in acquiring bank markets seem to lead to increased systemic risk post-merger. This is consistent in the bank-real estate, bank-investment and bancassurance deals. Most likely attributed to being repellents or motivators for banks to explore other markets or other product orientated FIs for growth affecting their risk perception from shareholders which reflects in the market value of equity, as a component of SRISK estimation.

Table 4-7 The effect of the Product diversification and target financial institutions' line of business on systemic risk contributions and explanatory factors.

Delta SRISK	Product Diversification Bank Merger Orientation		Product Focus Bank Merger Orientation		Bank-Real Estate Mergers		Bank-Investment Mergers		Bank-Insurance Mergers	
	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t
Deal Value	31896.04***	0.001	502.095***	0.005	1667.53***	0.001	685.131	0.001	-161.5347	0.002
CAPRQ	-5886256.00***	0.020	24600000.00***	0.000	-1469628.00***	0.061	Omitted for Multi-Collinearity		Omitted for Multi-Collinearity	
PRMONT	-69400000.00***	0.000	41400000.00***	0.000	10600000.00***	0.000	Omitted for Multi-Collinearity		Omitted for Multi-Collinearity	
ACTRS	36300000.00***	0.000	3491447.00***	0.005	1056811.00	0.182	Omitted for Multi-Collinearity		Omitted for Multi-Collinearity	
SPOWER	737141.20	0.762	-7190395.00***	0.000	10900000.00***	0.000	Omitted for Multi-Collinearity		Omitted for Multi-Collinearity	
Economic Freedom	-13500000.00***	0.000	6212067.00***	0.000	-2386474.00***	0.000	Omitted for Multi-Collinearity		194013.20***	0.000
Financial Freedom	8465559.00***	0.000	-2736965.00***	0.000	306725.20***	0.000	Omitted for Multi-Collinearity		-128803.20***	0.000
Bank Concentration(5)	3787754.00***	0.000	-1425367.00***	0.000	46984.39	0.583	40974.28	0.000	96881.21***	0.000
Lerner Index	333000000.00***	0.000	871000000.00***	0.000	138000000.00***	0.000	Omitted for Multi-Collinearity		Omitted for Multi-Collinearity	
TFPCH	-10800000.00***	0.000	-417725.20	0.275	-1443071.00***	0.000	Omitted for Multi-Collinearity		Omitted for Multi-Collinearity	
EVA	-78300000.00***	0.000	4097285.00***	0.000	300023.10	0.276	Omitted for Multi-Collinearity		333525.20***	0.000
SGR	-417619.50***	0.000	338087.10***	0.000	-530979.30***	0.000	Omitted for Multi-Collinearity		-373416.60***	0.000
ROA (%)	-214000000.00***	0.000	-22700000.00***	0.000	-20100000.00***	0.000	Omitted for Multi-Collinearity		Omitted for Multi-Collinearity	
Leverage	-22800000.00***	0.000	136553.20	0.897	1993558.00***	0.000	Omitted for Multi-Collinearity		41298.47***	0.000
NOPAT	-15499.53***	0.000	-8134.84***	0.000	7007.70***	0.000	5811.97***	0.000	5669.48***	0.000
OPPE	39.08***	0.000	101.11***	0.000	61.06***	0.000	-0.25***	0.000	9.26***	0.000
Operating Margin	7820538.00***	0.000	109949.20	0.471	-1144242.00***	0.000	Omitted for Multi-Collinearity		-90232.22***	0.000
Efficiency Ratio	-742544.70***	0.000	307248.20***	0.008	35206.00	0.626	-24123.20***	0.000	16988.66***	0.000
cons	327000000.00	0.016	-692000000.00	0.000	-35800000.00	0.224	150112.30	0.000	-5251911.00	0.000
No. of Obs	96		337		1,430		No. of Obs	358	No. of Obs	672
Prob>F	0.0012		0.0003		0.0000		Prob>F	0.0000	Prob>F	0.0000
R-Squared	0.1722		0.5237		0.9537		R-Squared	0.9990	R-Squared	0.999
Root MSE	210,000,000.00		440,000,000.00		19000000		Root MSE	0	Root MSE	0

This table shows the effect of product diversifying mergers and the associating factors of target financial institutions industry (line of business) on systemic risk contributions upon merger announcement. CAPRQ, PRMONT, ACTRS and SPOWER represents the proxies of regulatory regime towards capital requirement, monitoring, restrictions and supervisory power. Economic and Financial Freedom are Proxies for the financial sector freedom and the overall level of economic freedom. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. ROA (%) is the return on Assets. Lerner Index is a measure of market power in the banking market. Total Factor Productivity Change (TFPCH) is an index of efficiencies that is calculated by applying the ratio of differences on vectors of inputs and outputs. EVA represents the economic value addition or the enterprise value. SGR is the Sustainability Growth Rate. Leverage is the debt to equity ratio. NOPAT is the net operating profit after tax. OPPE is the Operating profit per employee, expressed as Operating Income(Loss)/(Number of Employees). Operating Margin Ratio measures a company's pricing strategy and operating efficiency, in percentage, is Operating Income (Losses) / Total Revenue \* 100. Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.

Productivity change, economic value addition, sustainability growth rate, leverage, net operating profit after tax and return on assets appear to all have significantly lowered systemic risk contribution after merger announcement in all diversified deals. This supports and materialises the concept of geographic diversification stability, achieved through enhanced performance and efficiency following mergers. Furthermore, product (activity) diversifying bank mergers appear to contribute significantly to enhancing operations efficiency and operating profit in addition to leverage that reflects the quality of capital over consolidated assets<sup>81</sup> (Laeven *et al.*, 2016; Barth *et al.*, 2001a; Vickers Report, 2011). The result is consistent until 120 days after the merger announcement. However, bank-bank mergers seem to utilise productivity change and profitability (ROA) to enable acquirers to decrease systemic risk contribution, but not while pursuing economic value addition or sustainability growth. In other words, focused mergers seem to achieve short to medium term performance but in a sustainable nor long term improvement.

When banks merge with non-bank FIs, they do still have a positive and significant impact on operating profit and capital to assets (leverage) ratios, but at a lower magnitude compared to focused bank mergers. This result resounds product diversification fragility. Bank size also appears to increase systemic risk contribution generating from a bank to non-bank FIs merger. This is apparent in the increase in SRISK with high values of log total assets of acquiring banks in activity diversifying

---

<sup>81</sup> The Basel III leverage ratio (LR) is designed to restrict the build-up of leverage in the banking sector and to backstop the existing risk-weighted capital requirements (RWRs) with a simple, non-risk-weighted measure. This special feature presents a conceptual framework for the calibration of the LR, focusing on the LR's cyclical and structural dimensions as well as its consistency with the RWRs. It then applies the framework to historical bank data. Subject to various caveats, it finds that there is considerable room to raise the LR requirement above its original 3% "test" level, within a range of about 4-5%. Doing so should help to constrain banks' risk-taking earlier during financial booms, providing a consistent and more effective backstop to the RWRs" (Fender and Lewrick, 2015; BCBS, 2015).

deals. This effect emphasises on the too-big-too-fail status that banks thrive in order to gain immunity and priority in bailouts, especially following the 2008 crisis.

An extension of the regression on target institutions line of business reveals further exciting results about the factors affecting SRISK and their association. A random-effects Maximum Likelihood regression was conducted to include other endogenous and exogenous variables that might influence how SRISK have shifted upon announcement, and not only the variation of SRISK post-merger compared to pre-merger.

**Table 4-8** shows that bank-investment mergers appear to increase systemic risk contribution of acquiring banks in double-digit folds (16 and 73 times more than Diversified and Real estate Targets). Connectedly, acquiring bank size has a significant similar impact on lowering SRISK contribution of bank-investment mergers but the insignificant increasing effect in all other deals. This reflects the overall riskiness of bank mergers with non-bank FIs and the decreased risk perception of bank-investment mergers. Probably because most commercial banks are initially, directly or indirectly, involved in investment activities, as second nature to their activities, hence they are existentially perceived non-diversifying mergers. This explanation is also justified in payment type factor, where payment of the bank-investment deal lowers systemic risk contribution when it is made up of higher proportions of stocks, debts or a combination of both (Gambacorta and Rixtel, 2013; Irresberger *et al.*, 2016; Demirgüç-Kunt and Huizinga, 2010). When a product diversifying deal is cross-border, real estate and investment firms increase the systemic risk contribution, contrary to insurance targets. This result is mainly due to differences in several environmental (legal-judicial, political and social) factors that vary significantly more in real estate and investment processes than in insurance ones across nations (Baluch *et al.*, 2011; Molyneux *et al.*, 2014).

Table 4-8 Maximum Likelihood Showing the association of Systemic Risk upon merger announcement with deal criteria and contributory factors under different targets institutions types.

Random-effects ML Regression	Target is A Diversified FIs	Deal is a Bank-Real Estate M&A	Deal is a Bank-Investment M&A	Deal is a Bank-Insurance M&A
<b>SRISKFII0</b>				
	Coef.	Coef.	Coef.	Coef.
Deal Value	-32,912.36***	-7,537.812*	513,185.6***	2,028.968
Payment Type	36,800,000**	-73,84823	-504,000,000***	-36,200,000**
Geographic Orientation	-4,824,155**	53,600,000**	790,000,000***	-205,000,000*
EVA	12,900,000**	3,528,456	-86,100,000***	7,577,889
CAR120	-659,000,000**	146,000,000**	Omitted for Multi-Collinearity	-352,000,000**
CAPRQ	-7,654,182**	-3,456,932	98,100,000	17,700,000**
ACTRS	7,212,800**	4,096,752**	77,800,000***	15,600,000**
SPOWER	23,100,000**	2,375,824	-81,000,000***	9,625,326
Economic Freedom	-4,695,876**	-1,630,257	Omitted for Multi-Collinearity	4,455,287
Financial Freedom	1,725,905**	-168,328.1	-14,400,000***	415,566.2
Z Score	1,892,690**	2,365,158**	Omitted for Multi-Collinearity	746,753.6**
Bank Concentration	4,013,463**	-28710.93	-24,500,000***	2,464,464*
Lerner Index	224,000,000**	-37,200,000	406,000,000	826,000,000***
Ln Total ASSETS	5,922,417**	-5,119,300	-24,500,000*	19,100,000*
EFFCH	-329,000,000**	-39,900,000	-4,520,000,000***	258,000,000*
TECHCH	6,271,311**	-60,500,000***	-1,820,000,000***	42,600,000*
PECH	249,000,000**	-41,000,000	2,070,000,000***	-167,000,000
SECH	339,000,000**	-15,400,000	1,130,000,000***	-316,000,000*
TFPCH	-4,963,021**	95,100,000***	1,940,000,000***	-60,000,000*
SGR	-7,685,658***	-2,431,628***	Omitted for Multi-Collinearity	-4,164,777***
ROA (%)	167,000,000***	8,572,304**	966,000,000***	156,000,000***
Leverage	7,774,373***	1,172,409	-144,000,000***	16,900,000***
NOPAT	4,091.342***	1,780.051***	Omitted for Multi-Collinearity	2,163.48***
cons	-1,040,000,000**	216,000,000	4,540,000,000	-1,380,000,000***
Prob > chi2	0.0001	0.00025	0.00234	0.0141
LR chi2(23)	531.45	464.27	64.91	40.33
Log likelihood	-3744.9648	-2405.44	-367.994	-731.985
Prob >= chibar2	0.051	0	1	1
Obs	179	121	20	37
Groups	31	23	9	17

Shows the influence of regulatory, market and idiosyncratic variables of bank mergers in addition to the influence these mergers announcements on profitability, leverage versus systemic risk upon announcement, where targets are Diversified FIs, Real Estate firms, Insurance or Investment companies. SRISKFII0 is the systemic risk upon announcement (Day 0) estimated over financial institutions index. Deal value is the value of deals in real terms expressed in \$US Millions. Payment is a proxy variable for payments types of Cash, Debt, Stock or a combination of two or more. Geographic orientation is a proxy to differentiate between national and cross border deals as an endogenous variable to be examined over the different targets' lines of business mergers. CAR120 are the cumulative abnormal returns between day -1 and day +20. Z score is a proxy for banks risk through the solvency of individual banks calculated based on Return on Assets, and Equity to Assets ratio (capitalisation;  $Z = (ROA + (equity/assets)) / St. Dev.(ROA)$ ). Rest of Variables are as explained in previous models. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.

This effect is even more apparent when regulatory variables of activity restrictions and supervisory power counter behave in their contribution to bank-investment mergers cross-border; ACTRS plays a repelling from local market effect while SPOWER, which is a measurement of the extent to which a country has “legal and judicial framework”<sup>82</sup> provides a risk-decreasing effect. Financial freedom and bank concentration follow the same suite of supervisory powers. Performance-wise, diversified and investment targets tend to enhance overall efficiency but not technical efficiency, contrary to bank-real estate deals where technical efficiency change accompanied lower systemic risk contribution.

Consecutively, scale efficiency is mostly accompanied by lowering systemic risk contributions in bank-insurance deals and to a lower extent bank-real estate deals, but the opposite is correct for bank-diversified FIs and Bank-Investment mergers. The same holds for total factor productivity change and systemic risk contributions of various deal types. This outcome is majorly reflecting the technical experience and their distribution and match between acquiring banks and targets FIs (Vennet, 2002; Herring and Carmassi, 2010; Dzhagityan, 2018). Consequently, due to the continuous technological change and banks' known history of innovation, it is deemed necessary to continuously examine the factors mentioned above along with the recent regulations (2012-2018) and their impact on bank consolidations and their effectiveness. Especially with the high likelihood that financial markets will witness the expansion of the traditional banking models over the diversified ones DeYoung (2012). That is, banks will be more likely to fund loans with a much higher proportion of bank deposits than asset-backed securities, accompanied by cutting back on credit availability for

---

<sup>82</sup> “legal and judicial framework ” including an adequate insolvency regime to provide each responsible authority with the legal powers necessary for an efficient resolution of banks, expeditious liquidation of assets and fair and equal treatment of creditors (BCBS, 2015) .

sub-prime borrowers. This approach will permit banks to continue to benefit from the positive role of securitisation as a financial technology. Especially through its role in generating significant financial and informational efficiency. Those, in turn, support developing diversification approaches with more prudence by lenders, more diligence by investors, and greater regulatory oversight (ECB, 2018; DeYoung, 2012; Hirtle and Stiroh, 2007; Vennet, 2002; Houston *et al.*, 2001). The sustainability growth rate, which is a function of return on equity, expresses significant improvement and decreases systemic risk contribution in all diversifying deals, although to tens and hundreds of folds lower than the impact of TFP change and scale efficiency. Such scalable variation is mostly attributed to the variations of investment and funding structures (debt and equity fractions) of the mergers, which is correlated with payment type. Return on assets, leverage and net operating profit follow an opposite suite to SGR and return on equity, in all diversifying deals. A resolution that mainly reflects that riskier deals (more substantial systemic risk contribution) have yielded higher returns and operating profits in the same year of the merger announcement. Once again reflecting the fact of higher returns are usually accompanied by higher risks.

Hence, results from the previous two sections, lead to postulating that, from a systemic risk perspective, the best strategy for bank mergers is geographic diversification combined with product focus, i.e. *bank to cross-border bank* deals. However, these mergers are also required to be scrutinised for; a) idiosyncratic factors of systematic risk, existing efficiencies and operating profits, sizes and leverage and capital structures and b) for market factors and the sectorial and regulatory environments. These results are further accentuated and perpetuated when the sample is split over Strategic Orientation to Penetration (bank to national bank mergers) and Conglomeration (Bank to non-bank FIs cross border mergers) (**Tables 4-6, 4-7 and 4-8**).

### 4.5.3 Risk, diversification and crisis

Bank mergers literature highlights the importance of considering the impact financial crisis on mergers and operations of financial institutions, and vice versa. Whether it is examining the effect of the financial crisis and how it brought down the number of mergers and acquisition deals significantly, or the effect of mergers and involved financial institutions' risk initiation and propagation because of their merged operations (Baluch *et al.*, 2011; De Jonghe, 2010; Ibragimov *et al.*, 2011; Parsons and Mutenga, 2009).

**Table 4-9** summarises the numbers and values of bank mergers announcements during 2008 (late 2008-2011) crisis. Between August 2007 and December 2011, a total of 209 bank mergers were announced and completed. The number of deals almost split in half between geographic focus and geographic diversification (Target is crossborder), and 43% product diversification (target is non-bank FI) to 56% bank to bank deals. While in deals value, this distribution becomes 40% - 60% and 26.3% - 73.6%. Throughout the financial crisis bank, mergers have slowed down to reach 19 deals with the overall value of \$US 10,468 million in 2011.

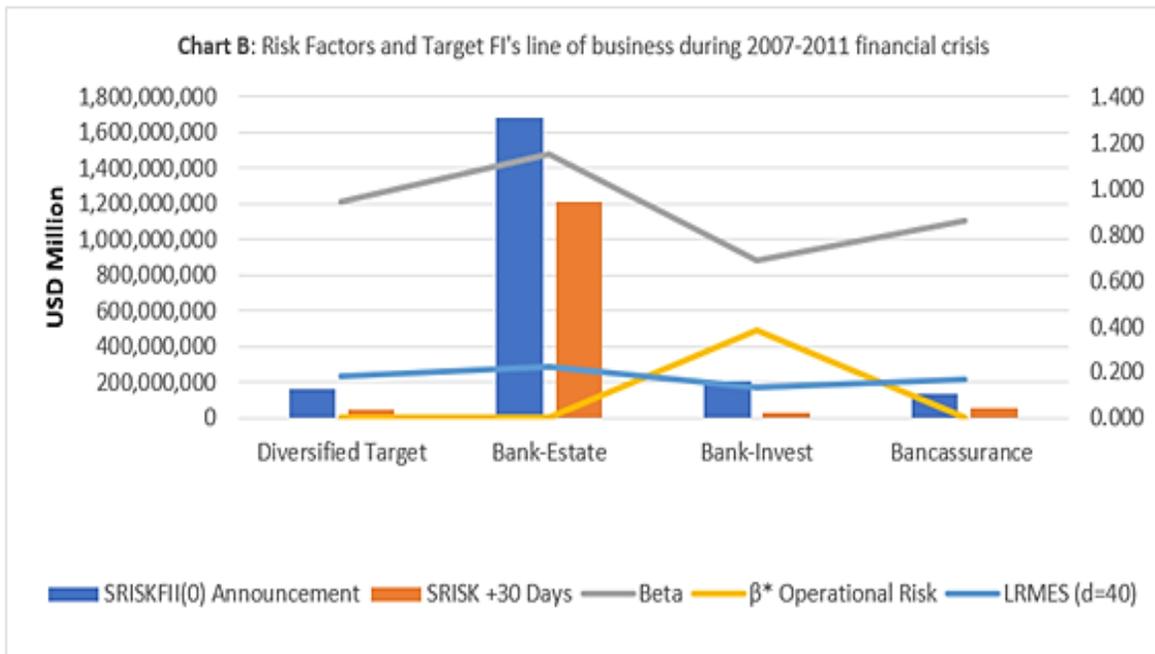
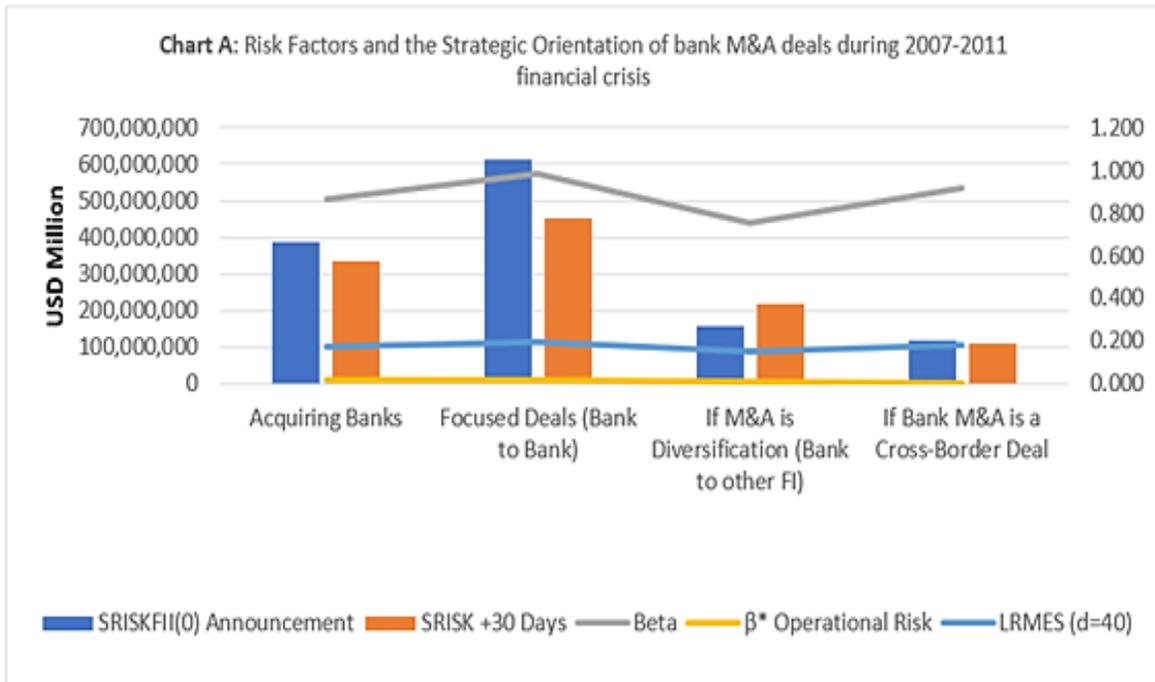
**Table 4-9 Summary Statistics of FIs mergers that are announced during the 2008-2011 Financial Crisis and their distribution over deal orientation.**

Summary Statistics showing number and value of bank merger deals during the 2007-2011 financial crisis over years and regions, and Ansoff's Matrix categorisation of deal orientations of geographic and product focus or diversification.								
	Number of M&A Deals during 2008 Financial Crisis							Total
	Africa	ANJ	Asia	Eastern Europe	Latin America	North America	Western Europe	
<b>Total of Deals Per Region</b>	2	22	34	2	10	70	69	209
<b>Geographic Diversification</b>	1	8	18	1	3	17	51	99
<b>Geographic Focus</b>	1	14	16	1	7	53	18	110
<b>Product Diversification</b>	1	8	10	0	3	24	44	90
<b>Product Focus</b>	1	14	24	2	7	46	25	119
<b>Total Diversification</b>	1	3	4	0	1	11	35	55
<b>2007</b>	0	3	6	0	2	16	8	35
<b>2008</b>	0	5	7	0	3	20	30	65
<b>2009</b>	0	8	5	1	2	11	15	42
<b>2010</b>	0	6	10	0	2	16	14	48
<b>2011</b>	2	0	6	1	1	7	2	19
<b>Total Deals Per Year</b>	2	22	34	2	10	70	69	209
	Value of M&A Deals during 2008 Financial Crisis in \$US millions							Total
	Africa	ANJ	Asia	Eastern Europe	Latin America	North America	Western Europe	
<b>Total of Deals Per Region</b>								0
<b>Geographic Diversification</b>	360.54	5223.08	6422.01	243.2	715.07	23569.17	43167.82	79700.89
<b>Geographic Focus</b>	250.31	31904.91	14359.45	972.94	8437.97	35065.52	29884.45	120875.55
<b>Product Diversification</b>	360.54	4076.97	4802.25	0	495.32	13408.74	29689.27	52833.09
<b>Product Focus</b>	250.31	33051.02	15979.21	1216.14	8657.72	45225.95	43363	147743.35
<b>Total Diversification</b>	360.54	2816.19	930.26	0	114.85	8473.36	18685.63	31380.83
<b>2007</b>	0	3237.58	1605.46	0	234.85	14061.76	18541.85	37681.5
<b>2008</b>	0	18937.33	5709.42	0	5873.48	22273.21	35637.21	88430.65
<b>2009</b>	0	5396.56	2226.56	243.2	802.37	8928.72	7834.23	25431.64
<b>2010</b>	0	9556.52	9687.41	0	1615.54	8029.77	9674.54	38563.78
<b>2011</b>	610.85	0	1552.61	972.94	626.8	5341.23	1364.44	10468.87
<b>Total Deals' Value Per Year</b>	610.85	37127.99	20781.46	1216.14	9153.04	58634.69	73052.27	200576.44

In order to examine the impact of the financial crisis on bank mergers and systemic risk, a graphical representation of M&A deals during, before and after the financial crisis is constructed. **Exhibit 4.4 (A)** shows the systemic risk plots of all regions between 1990 and 2016. It shows that Systemic risk around bank mergers, or FIs mergers in general, can be a strong predictor of markets instability. It could also help predict the cost of that instability at firms levels, and at countries levels when aggregating all SRISK0 (or SRISK+10, SRISK+30, even SRISK+120) of individual banks in the same country. This result is evident in most of regions line charts of SRISK0; for instance, the surge in Western Europe and North America systemic risk between 2000 and 2002 reflects the accompanying distress witnessed in the financial sectors following the Dot-Com bubble. Similar episodes are also seen during the 2004 - 2006 period for Australasian and Latin American markets

accompanying the Japanese and Asian and Turkish, and Venezuelan crisis. Notably, by 2007, the systemic risk seems to have narrowed down before suddenly escalating to reach its maximum in every region until 2011-2012 when it began to consolidate.

**Chart (B) of 4.4** shows a different unusual behaviour of risk during the crisis. It exhibits that, before the 2008 financial crisis and until 2014 systemic risk contribution of various bank deals was perceived similarly, and until the beginning of 2007, geographic diversification yield below average systemic risk. Probably due to established international stability and due to risk diversifying initiatives and resolutions witnessed in cross-border deals. Fluctuations and magnitudes of systemic risk increased between 2007 and 2009, with product diversification leading the risk chart, along with cross-border deals and non-bank cross-border deals. This is mainly attributed to the number and value of product-focused deals took place during the 2008-2011 period, where around half of the deals were product focusing ones with 74% of the value.



**Figure 4-4 Risk Factors behaviour and the Strategic Orientation of FIs M&A deals during the 2008-2011 financial crisis.**

Remarkably, after 2011 SRISK surged for both product diversification and non-bank cross-border deals, above average and higher than geographic diversification, this further proves diversification fragility, especially during a crisis. The direct effects of the financial crisis on markets stability and mergers transaction took until 2014 to reach a reasonably proportional distribution of risk over deal types. Bank to non-bank cross-border mergers (conglomeration) still lead the contribution of systemic risk upon merger announcement followed by product diversification and then cross-border deals.

Further, idiosyncratic (firm), market and regulation factors affecting systemic risk are estimated during the 2008 financial crisis. A subsample of the original panel is extracted to account for only the deals that took place between August 2007 and August 2011. Results in **Table 4-10** show that regulatory factors had a completely opposite effect on systemic risk variation ( $\Delta\text{SRISK} = \text{SRISK}_{\text{after}} - \text{SRISK}_{\text{before}}$ ) between the years before and the years of the mergers compared to the ones after merger announcements. Capital requirements, private monitoring and activity restrictions were all systemic risk instigators to bank mergers that were announced during the 2008-2011 financial crisis. This is apparent from the SRISK association with these regulatory variables before and during announcements years. This reflects the positive perception of heightened regulations imposed following the crisis, and the opposite perception of being costly and performance impediments before regulation imposition. Economic freedom expresses a similar reaction; where, during the crisis, economic freedom can be viewed as a threat to banks because of openness and competition from foreign FIs before the merger announcement. While it settles lower in the same year of announcement and turns to a systemic risk-limiting factor after the announcement, due to its contribution in opening opportunities to diversify risks and sources of income. Productivity change, profitability and efficiency prove to continue to contribute to limiting systemic risk initiated by bank mergers.

**Table 4-10 Factors (pre- and post-merger) influencing systemic risk change for mergers took place in the years 2008-2011 crisis.**

Delta SRISK	Pre-Announcement Year Indicators		Same Year Indicators		Post - Announcement Year Indicator	
	Coef.	P> t	Coef.	P> t	Coef.	P> t
CAPRQ	5,797,511***	0.038	10,000,000***	0.000	-5,982,427***	0.000
PRMONT	17,600,000***	0.000	7,071,009***	0.036	-5,310,439***	0.001
ACTRS	3,989,960***	0.005	3,763,857***	0.003	-1,022,085	0.125
SPOWER	-3,008,308***	0.015	-7,304,669***	0.000	1,104,269***	0.039
ECONOMIC FREEDOM	5,005,028***	0.000	619,455.3	0.382	-2,551,550***	0.000
Financial Freedom	-1,264,018***	0.000	58,078.59	0.855	1,027,990***	0.000
Bank Concentration(5)	127,879.2	0.349	-198,776.4	0.222	103,181.2	0.211
Lerner Index	657,000,000***	0.000	397,000,000***	0.000	-67,300,000***	0.000
TFPCH	-9,961,842***	0.000	-7,024,361***	0.000	-4,850,055***	0.000
EVA	-916,372.2***	0.001	-8,041,845***	0.000	3,783,542***	0.000
SGR	250,626.7***	0.000	9,293.089	0.477	-1,343,672***	0.000
ROA (%)	-22,900,000***	0.000	-41,300,000***	0.000	-42,800,000***	0.000
Leverage	-227,401.3	0.612	-4,686,483***	0.000	-6,929,790***	0.000
NOPAT	-2,153,933***	0.000	61.92634	0.772	-3.882196	0.240
OPPE	8.194434***	0.000	8.108733***	0.005	-0.0564136	0.240
Operating Margin	460,465.9***	0.000	1,107,865***	0.000	1,369,148***	0.000
Efficiency Ratio	-136,080.1***	0.000	-103,007.9***	0.000	-112,081.9***	0.000
cons	-501000000	0.000	-78500000	0.221	331000000	0.000
No. Obs (Group variable: countries)	25,803		26,738		28,199	
R-Squared	0.122		0.172		0.141	
P>F	0.000		0.000		0.000	

*This table shows the effect of the 2007-2011 financial crisis on the factors affecting bank mergers performance and systemic risk. Estimation of performance variables are made in the same year of announcement (2007-2011), before (2006) and after (2012). CAPRQ, PRMONT, ACTRS and SPOWER represents the proxies of regulatory regime towards capital requirement, monitoring, restrictions and supervisory power. Economic and Financial Freedom are Proxies for the financial sector freedom and the overall level of economic freedom. They are composite indices that are calculated by considering: business freedom, trade freedom, fiscal freedom, government spending, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, labour freedom. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. ROA (%) is the return on Assets. Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, mark-up). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries. Total Factor Productivity Change (TFPCH) is an index of efficiencies that is calculated by applying the ratio of differences on vectors of inputs and outputs. EVA represents the economic value addition or the enterprise value being an index based on the estimation of the Weighted Average Cost of Capital. SGR is the Sustainability Growth Rate. Leverage is the debt to equity ratio. NOPAT is the net operating profit after tax. OPPE is the Operating profit per employee OPPE, expressed as Operating Income(Loss)/(Number of Employees). Operating Margin Ratio measures a company's pricing strategy and operating efficiency, in percentage, is Operating Income (Losses) / Total Revenue \* 100. Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.*

Further investigation of the 2008-2011 crisis is exploring the SRISK change resulting from bank mergers variations between before, during and after the financial crisis. **Table 4-11** presents the variation of systemic risk changes influenced by mergers that took place around the 2008-2011 financial crisis and the factors motivating this change. The average of delta systemic risk shows that mergers played a role and was perceived as a risk-limiting option during the financial crisis. This result is clear from the high negative average and median delta SRISK between 2008 and 2011 compared to after 2011 and before 2007. Although the standard deviation of  $\Delta$ SRISK has multiplied from before 2008 to during the crisis, skewness has decreased, implying the variety of deals outcomes rather outliers. Descriptive statistics also show that delta systemic risk became more controllable during the crisis with narrow tails compared to the periods before and after the crisis. Most likely reflecting the impact of measures taken in the early stages of the crisis that materialised in the years 2009, 2010 and 2011. However, considering the financial sectors tendency to innovate, measures controlling risk, and measure to lower the perception of risk by investors diminishes rapidly.

*Table 4-11 The 2008-2011 financial crisis effect on Systemic risk variations and the accompanying factors.*

<b>Delta SRISK</b>	<b>Mergers Before 2007</b>		<b>Mergers between 2008-2011</b>		<b>Mergers after 2011</b>	
<b>Average (Mean)</b>	713,064.30		-300,000,000.00		-100,878.70	
<b>Standard Deviation</b>	549,000,000.00		1,750,000,000.00		2,880,000,000.00	
<b>Median</b>	-309,239.80		-13,400,000.00		-100,878.70	
<b>Skewness</b>	-7.54		-5.52		-13.55	
<b>Kurtosis</b>	270.08		35.29		217.42	
<b>Delta SRISK</b>	<b>Coef.</b>	<b>P&gt; t </b>	<b>Coef.</b>	<b>P&gt; t </b>	<b>Coef.</b>	<b>P&gt; t </b>
<b>Deal Value</b>	-315.22	0.423	45,814.54***	0.000	76,192.50***	0.000
<b>Payment Type</b>	22,700,000.00***	0.000	-270,000,000.00***	0.000	9,931,749.00	0.319
<b>Operational Risk (<math>\beta^*</math>)</b>	-16,800,000.00*	0.084	-62,900,000,000.00***	0.000	-207,000,000.00**	0.017
<b>CAPRQ</b>	-10,500,000.00***	0.000	-635,000,000.00***	0.000	42,500,000.00	0.458
<b>PRMONT</b>	-34,400,000.00***	0.000	769,000,000.00***	0.000	-33,600,000.00	0.795
<b>ACTRS</b>	-11,600,000.00***	0.000	-493,000,000.00***	0.000	64,800,000.00*	0.087
<b>SPOWER</b>	-2,224,586.00	0.436	885,000,000.00***	0.000	-78,200,000.00	0.301
<b>Economic Freedom</b>	-3,761,980.00***	0.000	-114,000,000.00***	0.000	-17,143.71	0.997
<b>Financial Freedom</b>	1,548,598.00***	0.000	2,870,049.00	0.868	2,556,575.00***	0.003
<b>Bank Concentration (5)</b>	-441,343.90	0.215	-26,800,000.00**	0.011	4,460,882.00	0.311
<b>Lerner Index</b>	80,400,000.00*	0.075	Omitted - Collinearity		-808,000,000.00	0.110
<b>TFCH</b>	-6,452,953.00***	0.000	1,640,000,000.00***	0.000	-6,060,930.00***	0.000
<b>EVA</b>	91,269.15	0.907	201,000,000.00***	0.000	-27,000,000.00***	0.000
<b>SGR</b>	4,290.82	0.888	-3,604,645.00***	0.000	1,410,860.00	0.106
<b>ROA (%)</b>	-19,700,000.00***	0.000	-1,230,000,000.00***	0.000	-159,000,000.00***	0.000
<b>Leverage</b>	-7,652,852.00***	0.000	-19,100,000.00***	0.000	-20,300,000.00***	0.000
<b>NOPAT</b>	-2,198.81***	0.000	-18,633.09***	0.000	-4,711.92***	0.000
<b>OPPE</b>	10.72*	0.087	-2,455.00***	0.000	-41.58	0.425
<b>Operating Margin</b>	695,514.00***	0.000	8,807,747.00***	0.000	4,369,273.00***	0.000
<b>Efficiency Ratio</b>	-28,224.50	0.454	-1,019,596.00	0.437	-330,045.20	0.608
<b>_cons</b>	625,000,000.00	0.000	6,270,000,000.00	0.000	457,000,000.00	0.748
<b>No. Obs (Countries as Frequency Weights)</b>	14,789		2,152		9,271	
<b>R-Squared</b>	0.0407		0.5215		0.3251	
<b>P&gt;F</b>	0.00010		0.02510		0.00235	

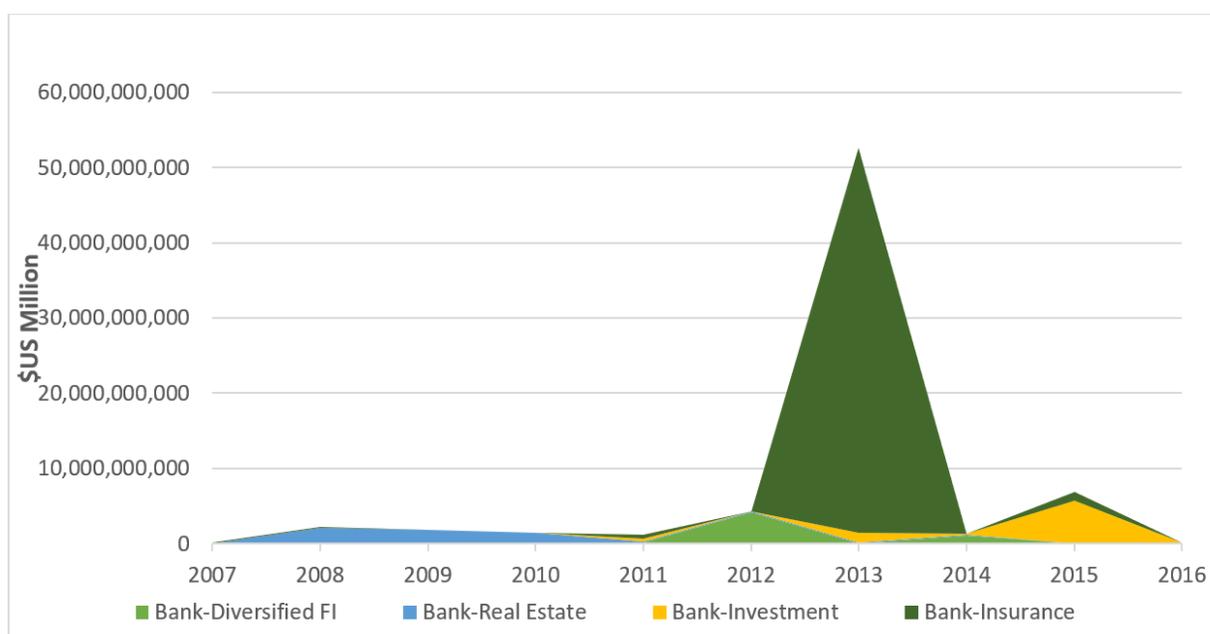
*This table shows the effect of the 2007-2011 financial crisis on the factors affecting bank mergers performance and systemic risk. Summary and estimation of performance variables are made over the period of the financial crisis (2007-2011), before (<2007) and after (>2011). Deal value is the value of the merger deals in \$US million. Payment type is a proxy for the payment method used to settle the deal, it can take the values of 0 if it is cash, stock, or cash and stock, and the value of 1 if the payment is undisclosed or includes debt. CAPRQ, PRMONT, ACTRS and SPOWER represents the proxies of regulatory regime towards capital requirement, monitoring, restrictions and supervisory power. Economic and Financial Freedom are Proxies for the financial sector freedom and the overall level of economic freedom. They are composite indices that are calculated by considering: business freedom, trade freedom, fiscal freedom, government spending, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, labour freedom. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. ROA (%) is the return on Assets. Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, mark-up). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries. Total Factor Productivity Change (TFPCH) is an index of efficiencies that is calculated by applying the ratio of differences on vectors of inputs and outputs. EVA represents the economic value addition or the enterprise value being an index based on the estimation of the Weighted Average Cost of Capital. SGR is the Sustainability Growth Rate. Leverage is the debt to equity ratio. NOPAT is the net operating profit after tax. OPPE is the Operating profit per employee OPPE, expressed as Operating Income(Loss)/(Number of Employees. Operating Margin Ratio measures a company's pricing strategy and operating efficiency, in percentage, is Operating Income (Losses) / Total Revenue \* 100. Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.*

The larger the deal value, the higher the systemic risk contribution a bank merger can cause. This outcome is consistent in all periods of the financial crisis. It reflects and coincides with the level of involvement an investor perceives. If the payment method announced to settle the merger is more debt and less cash or stock, the mergers appear to be more risk-bearing before and after the latest financial crisis. However, during the financial crisis, more debt becomes more risk-averse. This result interprets two distinct criteria of banks during the crisis, securitisation and higher levels of debt. This result is justifiable considering the peak of securitisation and mortgage back securities during the crisis, and banks need for borrowing for lending, in mortgages mainly, to facilitate and securitisation where securities moved away from banks balance sheets to off-balance sheets almost instantly (Altunbas *et al.*, 2009; Carpenter and Murphy, 2010). Further presentations on the impact of the type of payment can be seen the appendix (Table 4-13). A mixture of cash and stock is plausible for its risk decreasing effect in high leverage bidding banks. While the opposite is true for cash only and stock only paid deals. Primarily reflecting the fact that highly leveraged banks would defer from further debts to finance restructuring, including merger, and prefers levitating equity to maintain enterprise value (see EVA association under cash and stock). Higher operational risks show a consistent diminishing effect on systemic risk in all mergers around the crisis. Although at the bank level, beta operational is part of the general beta of the bank,  $\beta^*$  represents the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events, including legal risk, but excludes strategic and reputational risk. Therefore, although banks might face operational risk as part of there day to day management, they can remain successful in avoiding strategic and reputational risks similar to those banks instigated during 2008-2011.

Regulatory variables appear to be recognised differently over the trajectory of the crisis. Higher capital requirements that appear to be drastically decreasing systemic risk before and during the crisis, they become risk propensities after 2011. A similar reaction is witnessed from the activity's restrictions contribution. Considering CAPRQ and ACTRS in tandem indicates to the negative role banks see in higher capital requirements and buffers on their funds' availability for investment and diversifying income (Ketteni and Kottaridi, 2019; Merrouche and Nier, 2017; Hugonnier and Morellec, 2017). In the same vein, private monitoring and supervisory powers are systemic risk instigators during the crisis but risk dissuaders before and after the crisis. Also reflecting the positive role of these regulatory practices when preparing and recovering from distresses, but not during the difficulty due to immense need for resources and fund to remain operational and avoid strategic risks (Bakir, 2017; Mody and Sandri, 2014). Economic freedom, opposite to financial freedom, have consistently contributed to decreasing systemic risk contribution of bank mergers. The earlier facilitates foreign direct investments and foreign currencies that could stabilise affected banking systems, while the latter promotes fiercer competition affecting profits that are deemed necessary for survival during a crisis. This is more apparent in examining the limited role of concentration during the crisis only but before nor after, and the non-significant contribution of market power (Affinito and Pozzolo, 2017; Petersen and Wiegelmann, 2014).

Positive productivity change, profitability through returns on assets and after-tax net profits and efficiency are all witnessed as restraints of systemic risk in all periods of the financial crisis. However, in a similar analogy to this of operational risk and beta, operating margin alludes to the short-sighted performance negative influence on risk through targeting operating profit, but the sustained performance through after-tax net profits and general efficiency and productivity (Fahlenbrach *et al.*, 2012; Aebi *et al.*, 2012).

**Figure 4-5** compares estimated SRISK, on the day of the announcement, of acquiring banks on the relative merits of target FIs lines of business; insurance, investment and real estate. It reveals that even during the crisis, the levels of systemic risk contribution are relatively comparable and quite similar among all types of target FIs. Between 2011 and 2012 bank-diversified targets mergers realised the maximum of systemic risk among all other types of bank M&As. From 2012 to 2014, SRISK from bank-diversified FI descends, and bank-insurance deals emerge, where SRISK surmounts with a significant distinction (magnitude) from the rest of deal types.



**Figure 4-5 Average Systemic Risk (upon mergers announcement) behaviour during the financial crisis; average differences depending on Target FIs being a diversified FI, an Insurance company, Investment Company or a real estate firm.**

It appears that SRISK tends to have settled, in variation among targets industries and level, after 2014 with the dominance of systemic risk contribution from bank-insurance and bank-investment mergers. This explains two main hypotheses;

- The size and level of bank mergers transactions that actually took place during 2007-2016 affect beta and capital shortfall due to investors perception, during the crisis. Moreover, the

connection of the real estate sector bubble and the crisis' cascading effect in other industries in the financial sector and other sectors.

- It is notable how bank-investment and bank-insurance mergers have resurfaced as a more systemically risky strategy even after two years from the theoretical ending of the 2008-2011 crisis. Especially when the regulation themes following the financial crisis, that signalled ring-fencing and their calming effect on the financial sector and on the future of M&As (Vickers Report, 2011; Liikanen *et al.*, 2012; ECB, 2018; Detken *et al.*, 2018).

#### **4.5.4 Target FIs Risk and Performance**

In most of the bank mergers literature, there is almost negligible attention to the behaviour of target institutions for their risk and shareholders value adjustment before and after mergers. Hereafter is a comparative analysis of the systematic risk ( $\Delta\beta$ ), capital shortfalls (*LRMES-%*) and systemic risk (*ASRISK*) variations in response to bank mergers between acquiring banks and targets FIs. This analysis explores contributory factors of performance and its influence on risks and capital shortfalls in the years around the merger announcement (merger year, preceding and following ones). The panel of target FIs and data availability is around half of the acquirers one. Most of the missing values are because many targets FIs have ceased to exist; consequently, the equity is no more trading.

**Table 4-12** shows that targeting economic value addition in the years before the merger contributes to lowering the idiosyncratic risk ( $\Delta\beta$ ) as well as systemic risk and capital shortfalls in all acquiring banks and target financial institutions (FIs). This result persists to the year of the announcement but reverses to decrease capital shortfalls only while increasing systematic and systemic risk in the years following the merger announcement for both targets and acquirers. This may prove the situation where banks achieve resilience while pursuing enterprise value (EVA)

through preparation for several expansion strategies (including mergers) and the difficulty of achieving such value post-merger. This is evidenced by the consistent growing effect of ROA (as short-term profitability index) decreasing systemic and systematic risks for all bidding banks in all years around the merger and a consistent but opposite effect for the targets. Essentially, because mergers lead to having more competitive environment affecting banks profitability. And because in mergers, post-merger bidder and the target becomes structurally one or well-aligned institution, a decline in profitability affects them both concurrently (Athanasoglou *et al.*, 2008; Demirgüç-Kunt and Huizinga, 2000). Furthermore, evidence from previous sections along with this analysis on the role of EVA along with profitability appears to agree with Schmid and Walter (2009) who argues on the destroying effect of diversifying mergers on economic value. This further suggests how such performance can impair bidders' resilience and preparedness against risk by affecting firms profitability in the short run and firms value in the longer run. Pursuing sustainability growth which involves maximising revenue growth without increasing financial leverage appears to be a difficult strategy in bank mergers. Although SGR relatively contributes similarly to EVA in decreasing capital shortfalls, they diverge in systemic and systematic risk variations across the years of merger and before and after. Because SGR reflects returns on equity which focuses on earlier returns, opposite to the purpose of economic value addition, hence contributing less to the longer-term resilience (Olson and Pagano, 2005).

Efficiency ratio enhancement in the year of merger and previous year leads to decreasing systemic risk contribution of bidding banks only, while it does the opposite for targets FIs. This result reflects the need for bidding banks for efficiency enhancement and refers to the embedded aim of most of the bank mergers to improve on scale and scope efficiencies and benefit from exposure through diversification of presence and outlets to sell several connected and unconnected services (Amel *et al.*, 2004; Elyasiani and Wang, 2012; Du and Sim, 2016).

Table 4-12 Comparative analysis of performance factors effect on systematic risk, systemic risk and capital shortfalls between bidding banks and target financial institutions.

	Delta Beta		LRMES 40%		SRISK	
<i>Pre-Announcement Year Performance</i>	Acquirers	Targets	Acquirers	Targets	Acquirers	Targets
EVA	-0.0009867*	-0.0237005***	-0.0036075***	-0.0017501***	-770,564.00	-22,231.45***
SGR	0.0005266***	0.0034877***	-0.0001453***	-0.0010019***	253,710.9**	4,472.762***
ROA (%)	-0.0077307*	-0.016075	0.0210027***	0.0178607***	-27,400,000***	93,311.46***
Leverage	-0.0235721***	0.000224	-0.0008488***	-0.0018891***	-709,583.50	39,085.32***
NOPAT	-0.0000015***	0.000001	0.00000169***	0.000000219***	-2,237.694***	1.20
OPPE	-0.0000000175***	0.000000	-0.0000000129***	-0.00000000938***	9.228927***	0.00
Operating Margin	0.0022443***	0.0057228***	0.000368***	-0.0003583***	336,560.3***	-8,779.423***
Efficiency Ratio	-0.000103*	-0.0045217***	-0.0000394***	-0.000232***	-88,636.38	2,400.696***
cons	0.688809	0.282079	0.156869	0.110578	73000000.00	-193,766.20
No. Obs	25,838	9,685	25,838	9,685	25,838	9,685
R-Squared	0.3301	0.029	0.299	0.0197	0.54	0.0887
P>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<i>Announcement Year Performance</i>	Acquirers	Targets	Acquirers	Targets	Acquirers	Targets
EVA	0.000795	0.0156203***	-0.0055941***	-0.0132052***	-8,393,975***	-2,674.93
SGR	-0.000319***	0.005267	-0.0000445***	0.0023639***	41,205.05	-52,151.89***
ROA (%)	-0.000580	-0.4010368***	0.0328492***	0.0297946***	-38,700,000***	286,248.2***
Leverage	-0.0257657***	-0.039465***	0.0004337***	-0.0036227***	-4,314,628***	208,292.5***
NOPAT	0.00000267***	-0.000026	0.00000219***	0.0000123***	349.42	-2,458.231***
OPPE	-0.000000105***	0.000000	-0.0000000371***	-0.0000000974***	3.57	36.94611***
Operating Margin	0.0008042***	0.0096879***	0.0002024**	0.0013415***	1,100,763***	-79,268.3***
Efficiency Ratio	0.000050	-0.005278***	-0.00000323***	0.0029197***	-89,030.08	27,209.71***
cons	0.756659	1.046592	0.129623	-0.151146	75200000.00	-3533163.00
No. Obs	26,750	2,935	26,750		26,750	2,935
R-Squared	0.1189	0.055	0.0708		0.0117	0.18
P>F	0.0000	0.0000	0.0000		0.0000	0.0000
<i>Post-Announcement Year Performance</i>	Acquirers	Targets	Acquirers	Targets	Acquirers	Targets
EVA	0.0020708***	0.2709181***	-0.0041288***	-0.0183733***	4,060,269***	23,529.37***
SGR	-0.000086	0.4207606***	0.0001094***	-0.0273063***	-1,490,721***	-175,504.90
ROA (%)	-0.0966612***	-5.023992***	0.0185826***	0.301121	-36,700,000***	1,318,652***
Leverage	-0.0260859***	-0.1531718***	0.0018688***	0.014491	-5,530,778***	189,273.3***
NOPAT	-0.00000043***	-0.000277	0.0000000317***	0.000036	-4.0055	3,731.94
OPPE	0.000000	0.000000	-0.0000000104***	0.000000	0.0860	0.000
Operating Margin	Omitted for Multi-Collinearity		Omitted for Multi-Collinearity		Omitted for Multi-Collinearity	
Efficiency Ratio	-0.0001651***		Omitted for Multi-Collinearity		Omitted for Multi-Collinearity	
cons	0.826960	3.144035	0.139879	-0.200838	115000000.00	-3016515.00
No. Obs	28,234	187	28,234	187	28,234	187
R-Squared	0.1102	0.845	0.1102	0.642	0.1102	0.452
P>F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

This table compares systemic risk contributions, systematic risk and capital shortfall changes and their factors between acquiring banks and target financial institutions, in the year of the merger announcement, before and after. ROA (%) is the return on Assets. EVA represents the economic value addition or the enterprise value being an index based on the estimation of the Weighted Average Cost of Capital. SGR is the Sustainability Growth Rate. Leverage is the debt to equity ratio. NOPAT is the net operating profit after tax. OPPE is the Operating profit per employee OPPE, expressed as Operating Income(Loss)/(Number of Employees. Operating Margin Ratio measures a company's pricing strategy and operating efficiency, in percentage, is Operating Income (Losses) / Total Revenue \* 100. Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.

#### 4.5.5 Multivariate analysis of risks

The empirical literature around measuring and estimating systemic risk differentiates between two distinct approaches: the first approach that examines the network of (interbank) asset claims/liabilities and aggregate measures of network vulnerability and exposure (Billio *et al.*, 2012). This approach suffers from difficulties in practical implementations; **a)** because networks have become increasingly complex over the years, **b)** because it is hard to acquire sufficiently deterministic data on interbank claims, and **c)** the literature lacks a substantially conclusive measure of vulnerability (Gai and Kapadia, 2010).

The second approach on interconnectedness focuses on stock markets: based on prices of financial institutions' (banks') equity and the correlations in market prices of financial institutions, usually to determine banks' capital shortfall (Acharya *et al.*, 2010; Adrian and Brunnermeier, 2009). The latter is considered a practically feasible approach to address systemic risk; however, it ignores that default originates in the balance sheet.

Therefore, this chapter, in previous sections, has estimated the systemic risk by bridging both approaches, the equity and the balance sheet one through the equity and quasi leverage that accommodates assets book value in the denominator of the SRISK estimation<sup>83</sup>. This bridging of methods entails deploying the system of equations being built on several stages, implying a multi-stage regression in the way of decomposing a factor analysis.

---

<sup>83</sup> Recall that  $SRISK = Equity * [k * LVG + (1-k) * LRMES - 1]$  Where  $k$  is the prudential capital fraction (5.5% for Europe, 8% elsewhere),  $Equity$  is the market value of equity (FIs), and  $LVG$  is quasi-leverage calculated as  $LVG = \frac{Assets_{Book\ Value} - Equity_{book\ Value} + Equity_{Market\ Value}}{Equity_{Market\ Value}}$ .

Henceforth, the nature of the process to estimate systemic risk depends on several variables of numerous natures and sources. Categorically, the theoretical paradigm of systemic risk is the contribution of a bank risk at its systematic level to the system. Furthermore, the empirical analysis to estimate bidding banks systemic risk in response to mergers recapitulates several factors at the institution level, industry level and market level. Henceforth, structural equation modelling (estimation) is hereby utilised to illustrate and analyse the interconnection between these variables and factors in a structured approach (Kreis and Leisen, 2018). An approach that do not penalise the model by eliminating factors for multicollinearity or homoscedasticity but emphasise and capture the contribution of these variables as instrumental variables to arrive at SRISK estimation, or endogenous and exogenous variables to show the influence at firm and system levels (Corzo *et al.*, 2017; Kovacevic and Pflug, 2015).

The following two tables present a Two-Stage Least Squares (2SLS) instrumental analysis and a Three-Stage Least Squares (3SLS) estimations to analyse the instrumental effect of some variables on SRISK and the effect endogenous ( $\Delta\beta$  and LRMES-40%) and exogenous (regulatory and market conditions) variables on the evolution of systemic risk, respectively<sup>84</sup>. This practice is plausible for its dynamic feature that enables segregating variables over sector levels of influence and to view the systematic influence in the systemic profile of risks. This approach is essential to help clarify the

---

<sup>84</sup> 3SLS estimates a system of structural equations, where some equations contain endogenous variables among the explanatory variables. Estimation is via three-stage least squares (3SLS); see (Zellner and Theil, 1992). Typically, the endogenous explanatory variables are dependent variables from other equations in the system. This estimation supports iterated GLS estimation and linear constraints. Under 3SLS or 2SLS estimation, a structural equation is defined as one of the equations specified in the system. A dependent variable will have its usual interpretation as the left-hand-side variable in an equation with an associated disturbance term. All dependent variables are explicitly taken to be endogenous to the system and are treated as correlated with the disturbances in the system's equations. Unless specified in an endogenous option, all other variables in the system are treated as exogenous to the system and uncorrelated with the disturbances. The exogenous variables are taken to be instruments for the endogenous variables.

difference of association of the micro and macro (regulatory and market) factors with  $\Delta\beta$  and  $\Delta\text{SRISK}$ .

#### **4.5.5.1 Systemic risk instrumented by $\Delta\beta$**

Table 4-13 shows two panels of dynamic progressive estimation of systemic risk factors; panel A that shows  $\Delta\text{SRISK}$  instrumented by  $\Delta\beta$  and estimated over deal value and payment type, and panel B that presents  $\Delta\text{SRISK}$  instrumented by  $\Delta\beta$  and estimated over market conditions and regulatory regime. Panel A reveals that after establishing that bank SRISK contribution stems from their idiosyncratic risk, the influence of bank-specific factors continues to be plausible, and more plausible compared to estimation in no-dynamic models. Results emphasise on the significant risk (SRISK incubating beta) reduction effect of banks year-end performance indicators of profitability ROA, Leverage and net operating profit after tax. This performance leads to decreasing systemic risk in the consequences of decreasing systematic risk because of the resilience they provide to bidding banks through funds efficiency and buffers availability. Economic value addition appears to be persistently decreasing risk, confirming results in the univariate analysis stressing the role of enterprise value in assisting merging institutions to face individual eccentric risks. Bank size, measured by total assets, also helps the bidding banks reduce systematic and system risk, simultaneously, following mergers. This result perpetuates the perspective of regulators and investors on how bigger banks are more capable of mitigating risks and probably more qualified in benefitting from several efficiencies following a merger or acquisition. Specifically, through technological efficiency change that is usually sought from targets in different markets and activities portfolios. However, pure technical efficiency and scale efficiency changes (including operating profit per employee) emerge as risk additives. This result is associated with cases of larger deal values and more stock and debt payment types. These outcomes are often clear in bank mergers that have objectives other than growth and

value addition, like seeking systemic importance and too-big-to-fail statuses (Kaufman, 2014; Molyneux *et al.*, 2014).

**Table 4-13 Systemic risks instrumented by Delta Beta over Deal Value, Payment Type, regulatory factors and market conditions.**

Panel A			Panel B		
Systemic risk instrumented by Delta Beta over Deal Value and Payment Type			Systemic risk instrumented by Delta Beta over Regulatory Variables and Market Conditions		
	Coef.	P> z		Coef.	P> z
<b>Systematic risk (Delta Beta)</b>	-15,800,000.00	0.3140	<b>Systematic risk (Delta Beta)</b>	-335,000,000.00**	0.057
ROA (%)	-42,300,000.00***	0.0000	CAPRQ	-15,800,000.00	0.253
Leverage	-6,951,600.00***	0.0000	PRMONT	10,100,000.00***	0.047
NOPAT	-5,376.25***	0.0000	ACTRS	15,400,000.00***	0.005
EVA	-6,144,588.00***	0.0000	SPOWER	10,500,000.00	0.304
SGR	60,395.77	0.2130	Economic Freedom	1,192,339.00	0.325
Ln Total ASSETS	-6,466,402.00***	0.0000	Financial Freedom	-46,086.23	0.829
EFFCH	-45,400,000.00***	0.0090	Bank Concentration (5)	-1,525,544.00***	0.018
TECHCH	-6,440,386.00***	0.0000	Lerner Index	68,600,000.00	0.746
PECH	33,700,000.00***	0.0180	ROA (%)	-51,200,000.00***	0.000
SECH	23,900,000.00	0.1780	Leverage	-8,516,942.00***	0.000
OPPE	52.99***	0.0000	NOPAT	-5,228.67***	0.000
Operating Margin	1,227,527.00***	0.0000	EVA	-5,676,644.00***	0.000
Deal Value	2,229.75***	0.0000	SGR	-36,587.12	0.549
Payment Type	-4,269,915.00	0.3010	Ln Total ASSETS	-8,939,226.00***	0.000
_cons	233,000,000.00	0.0000	EFFCH	13,300,000.00	0.734
			TECHCH	-11,100,000.00***	0.000
			PECH	-7,023,512.00	0.800
			SECH	-38,200,000.00	0.326
			OPPE	42.13***	0.002
			Operating Margin	710,540.60***	0.002
			_cons	228,000,000.00	0.161
Observations	25546		Observations	25546	
Wald chi2(15)	792.87		Wald chi2(21)	821.60	
Prob>chi2	0.0001		Prob>chi2	0.0001	
R-Squared	0.0294		R-Squared		
RMSE	290,000,000.00		RMSE	310,000,000.00	

A two stage least squares regressions that takes a main examined variable of  $\Delta\beta$  as an instrument of a macro feature of banks systemic risk  $\Delta SRISK$ . This enables the examination of association of firm level performance variables with the latter through the earlier without penalising model significance. CAPRQ, PRMONT, ACTRS and SPOWER represents the proxies of regulatory regime towards capital requirement, monitoring, restrictions and supervisory power. Economic and Financial Freedom are Proxies for the financial sector freedom and the overall level of economic freedom. They are composite indices that are calculated by considering: business freedom, trade freedom, fiscal freedom, government spending, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, labour freedom. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. ROA (%) is the return on Assets. Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, mark-up). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries. Total Factor Productivity Change (TFPCH) is an index of efficiencies that is calculated by applying the ratio of differences on vectors of inputs and outputs. EVA represents the economic value addition or the enterprise value being an index based on the estimation of the Weighted Average Cost of Capital. SGR is the Sustainability Growth Rate. Leverage is the debt to equity ratio. NOPAT is the net operating profit after tax. OPPE is the Operating profit per employee OPPE, expressed as Operating Income(Loss)/(Number of Employees. Operating Margin Ratio measures a company's pricing strategy and operating efficiency, in percentage, is Operating Income (Losses) / Total Revenue \* 100. Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.

Panel B of Table 4-13 shows the two-stage regression systemic risk instrumented by delta beta coefficients ( $\beta_{\text{after}} - \beta_{\text{before}}$ ) over regulatory and market conditions in addition to banks performance year-end indicators<sup>85</sup>.

Results are partially consistent with the univariate analysis results. Although capital requirements increasing continues to play the assurance role and decrease systemic risk, and instrumentally systematic risk, private monitoring and activity restrictions appear to do the opposite. It is more evident with this regression that bank mergers prefer to have more financial freedom and fewer activity restrictions to enable them to generate income and build buffers against any unforeseen hardships. But they stand against costly measures of private monitoring and tend to prefer the regulator's role over banks individual initiative. This result is plausible and understandable to the effect of central (country) and international regulators on standardisation of practices and resilience rules that counter battle arbitrage and the influx of economic freedom and overly open markets for foreign competition (Bagliano *et al.*, 2000b; Beck *et al.*, 2006; Schaeck and Cihák, 2014). More importantly, the evidence here might suggest that banks prefer a “big brother” role of regulators to appear acting under its guidance and consequently contribute to their bailing out when banks become in need, as part of the system need (Drake *et al.*, 2006; Karolyi and Taboada, 2015b; Boyer and Kempf, 2017).

---

<sup>85</sup> Notation on R-Squared: The computational formula for R-squared is  $R\text{-squared} = 1 - \text{RSS}/\text{TSS}$ , where RSS is the residual sum of squares (sum of squared residuals) and TSS is the total sum of squared deviations about the mean of the dependent variable. In a standard linear model with a constant, the model from which the TSS is computed is nested within the full model from which RSS is computed—they both have a constant term based on the same data. Thus it must be that  $\text{TSS} \geq \text{RSS}$  and R-squared is constrained between 0 and 1. However, for 2SLS and 3SLS, some of the regressors enter the model as instruments when the parameters are estimated. Because the goal is to fit the structural model, the actual values, not the instruments for the endogenous right-hand-side variables, are used to determine R-squared. The model residuals are computed over a different set of regressors from those used to fit the model. The two or three-stage estimates are no longer nested within a constant-only model of the dependent variable, and the residual sum of squares is no longer constrained to be smaller than the total sum of squares.

#### **4.5.5.2 Systemic risk, endogeneity and exogeneity**

Table 4-14 presents related evidence but by utilising the three steps structural regression to highlight the significance of the association of systemic risk with other variables that divided into exogenous and endogenous. Importantly, the three-stage least square estimation can accommodate for the linear and non-linear system of equations estimations. This method enables examining the significance of systemic risk associated with exogenous and endogenous variables while accounting for the relationship between variables to be linear and non-linear<sup>86</sup>. Hence,  $\Delta$ SRISK is analysed over the vector of endogenous variables of risk; delta beta and capital shortfalls, that themselves connected idiosyncratically to exogenous variables of markets, regulation and firm performance.

Therefore, Delta Systemic Risk, as a latent variable, presents bidding banks contribution to risk at the systemic level. Hence the observed variables that are associated with SRISK at the system level are; activities restrictions and power of the supervisor (regulator), financial and economic freedom that are decided or maintained at the sector and country level, bank concentration, Lerner index and consumer price index that are observed variables at the country and system level too. On the other hand, delta beta is another latent variable that represents a bank's systematic risk and is influenced by merger deal criteria and the regulatory variables that pertain to a merger like capital requirements.

---

<sup>86</sup> Three stage least squares is a combination of multivariate regression (Seemingly Un-Related Estimation) and two stage least squares. It obtains instrumental variable estimates, taking into account the covariances across equation disturbances as well. The objective function for three stage least squares is the sum of squared transformed fitted residuals. Specification of the 3SLS command is the same as that of the LSQ command, except that the instruments (INST) list is required. The variables in the INST list will be used to instrument all the equations, so that the actual instrumental variable matrix has the form given by Jorgenson and Laffont (1974), rather than that given by Amemiya (1977). In a simultaneous equations model, this means that a variable cannot be exogenous to one equation and endogenous to another. Three stage least squares estimates are obtained by estimating a set of nonlinear (or linear) equations with cross-equation constraints imposed, but with a diagonal covariance matrix of the disturbances across equations. This is the constrained two stage least squares estimator. The parameter estimates thus obtained are used to form a consistent estimate of the covariance matrix of the disturbances, which is then used as a weighting matrix when the model is re-estimated to obtain new values of the parameters (Hausman, 1974).

Capital shortfalls (LRMES) do associate with merger announcement as a latent variable but is more pre- or post-determined by individual banks performance of exogenous variables that contributes to its capital adequacy through profitability, efficient allocation of resources and funds at the operational level and economic value addition at the long-run enterprise levels.

Results here diverge from the instrumental analysis above for some factors but do complement the univariate analysis for other exogenous ones. Activity restrictions are associated with decreasing systemic risk of banks following mergers, leveraging it to be a stabilising factor along with supervisory powers and financial freedom. It is acceptable to analyse that limiting banks diversification may lead to decreasing their incomes, but in the context of mergers, it can also be viewed as a risk-taking initiative where banks might not have the experience needed in other markets of investment, insurance or real estate. A similar justification extends to SPOWER and financial freedom. It might appear contradicting with results from two-stage LS regression, but it is consistent with how different factors affect systemic risk differently at different levels (Dontis-Charitos *et al.*, 2011; Goddard *et al.*, 2012b; Lerskullawat, 2017). Economic freedom is consistently considered a systemic risk booster, suggesting the implications of opening markets to overseas acquisitions and increasing competition in local markets and financial industry specifically (Hauswald and Marquez, 2006; Goddard *et al.*, 2012b; Huljak, 2015). This outcome is clear when considering the opposite association of market power and concentration. Inflation that represents the economic growth shows moderate (Coefficient in line with Financial freedom) risk reduction effect. This is justified by the growth in several sectors and financial services specifically through mergers and acquisition activity especially cross border ones leading to increased foreign direct investment (Andrade and Stafford, 2004; Doytch and Cakan, 2011).

**Table 4-14 Delta Systemic risk Structural modelling of endogenous and exogenous variables**

Equation	Obs	Parms	RMSE	R-squared	chi2	P
<b>Delta SRISK</b>	25,546	7.000	296,000,000.00	0.0067	183.9	0.000
<b>Delta Beta</b>	25,546	4.000	0.305643	0.0784	2123.24	0.000
<b>LRMES40</b>	25,546	13.000	0.067751	0.0724	2026.03	0.000
Endogenous Variable	Exogenous Variables					
<b>Delta SRISK</b>	<i>Coefficients</i>		<i>P&gt; z </i>			
	ACTRS	-7,384,981.00***	0.007			
	SPOWER	-4,603,070.00	0.144			
	ECFR	5,978,842.00***	0.000			
	Financial Freedom	-1,587,868.00***	0.000			
	Bank Concentration (5)	-1,618,761.00***	0.000			
	Lerner Index	432,000,000.00***	0.000			
	Consumer Price Index	-1,288,737.00***	0.000			
	_cons	-110,000,000.00	0.085			
<b>Delta Beta</b>						
	CAPRQ	-0.0599593***	0.000			
	PRMONT	-0.0007229	0.731			
	Deal Value	-0.000005490***	0.000			
	Payment Type	0.1151518***	0.000			
	_cons	0.6058519	0.000			
<b>LRMES40</b>						
	ROA (%)	0.035096***	0.000			
	Leverage	0.000872***	0.000			
	NOPAT	0.000001830***	0.000			
	EVA	-0.0063528***	0.000			
	SGR	-0.0000458***	0.000			
	Ln Total ASSETS	-0.0007501***	0.000			
	EFFCH	-0.0024042	0.532			
	TECHCH	0.0024652***	0.000			
	PECH	0.005816**	0.065			
	SECH	-0.0008025	0.840			
	OPPE	-0.000000028***	0.000			
	Operating Margin	0.0002739***	0.000			
	Efficiency Ratio	-0.000015	0.266			
	_cons	0.1264931	0.000			

*A three stage least squares regressions that examines banks systemic risk  $\Delta SRISK$  over its endogenous variables of risk and the exogenous variables of market factors, regulatory condition, and banks (FIs) performance and efficiency. This enables the examination of association of firm level performance variables with the latter through the earlier without penalising model significance. CAPRQ, PRMONT, ACTRS and SPOWER represents the proxies of regulatory regime towards capital requirement, monitoring, restrictions and supervisory power. Consumer Price Index measures the change in the prices of a basket of goods and services relative to a specified base period weighting; inflation. Calculated using the formula for the Laspeyres Price Index (LPI= [sum of price at observation\*quantity/Sum of base period\*base quantity]\*100, World Bank. Remaining variables are as explained in previous analysis. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.*

Concerning the idiosyncratic level of bank risk, capital requirements and private monitoring are no longer viewed as additional costs on banks that might limit their buffers and capital availability to face distresses. They are considered further assurances of capital availability, and of standards through PRMONT that helps to be “risk-ready” through enhancing the in-house developed risk monitoring, corporate governance and stress testing schemes (Laeven and Levine, 2009; Aebi *et al.*, 2012; John *et al.*, 2014). Furthermore, banks that are more “year-end orientated” appear to lose following mergers from their capital buoyancy through larger expected shortfalls of their capital. Contrary to the banks stressing the enterprise value and sustainable growth. This result is apparent from the association of various performance and efficiency indicators with the capital shortfall measure of Long Run Marginal Expected Shortfalls (LRMES). Economic value addition and sustainability growth rate along with scale efficiency that increases with merger progression along with the overall efficiency ratio, all have limited and decreased capital shortfall of bidding banks following M&As. On the contrary, yearend measure of profitability, debt ratio and operating profit have contributed to increasing capital shortfalls following bank mergers, essentially because merger contributes to improving long-term performance when a merger involves a relatively inefficient acquirer when partners reduce bankruptcy costs (DeLong, 2001a; DeLong, 2003; Ramirez, 2009), and when efficiencies and operating performance of the targets FIs improve following the merger as an effect from acquirers (Fraser and Zhang, 2009).

## 4.6 Conclusion

Driven by the continuously changing regulatory environment and the crises and distresses leading to them, or by firms' factors of performance and strategic shifts, the financial sector is usually subject to restructuring and expansion. It was also referred to as the expansion (innovation) – de-regulation - crisis - re-regulation innovation as a synthetic cycle (Kane, 1981a, 1977), which can be eased when economic and political powers find the optimal financial institution structure that can sustain a permanent, idiosyncratic and system-wide risk-return enhanced status.

Mergers and acquisitions are the main strategic routes that banks and financial institutions follow to achieve consolidations and restructuring. Towards the end of 2007, the world suffered from a financial crisis mainly caused by excessive *securitisation* of *mortgages (subprime)*. For this study, the 2008 crisis is of concern, due to the way it features banks involvement in other industries under the diversification paradigm, and its risk impact systematically and systemically.

Furthermore, there is a growing body of literature examining banks and financial institutions concerning their optimal structure and the activities to be engaged and whether to internationalise or conglomerate their presence and conduct if they are to maintain an adequate risk level. The bank merger literature diverges into two key aspects; the *diversification-stability* and the *diversification-fragility*. Although each hypothesis has its own merits and support, resolutions continue to be inconclusive. This is mainly due to; deal criteria (value, payment type, orientation), banks and financial institutions criteria (size, efficiency levels and performance before the merger) and markets and regulatory environments. Few studies support banks to diversify their activities along with their geographic exposure (Goetz *et al.*, 2016; Ekkayokkaya *et al.*, 2009; Deng and Elyasiani, 2008; Bessler and Murtagh, 2002) but others suggest that geographic expansion exposes banks to more risk (Beitel *et al.*, 2004; DeLong, 2001a; Beitel and Schiereck, 2001; Weiß *et al.*, 2014), especially in cross-border deals (Giesecke and Kim, 2011; Furfine and Rosen, 2011).

This study is not the first to analyse the systemic risk of bank mergers, but it is the first with a large sample of 1,260 deals examining merging FIs and the effects of efficiency and performance. Additionally, it is the most recent large study covering deals from 1999 to 2017. It is also the first study to use the local financial index (FII) of every firm/country to estimate beta instead of one global index (S&P 500 or BWFINL).

Results show that bank mergers, internationally, are associated with systemic risk, and its components of idiosyncratic systematic risk and capital shortfalls measured by beta, beta\* and Long Run Marginal Capital Shortfalls consecutively. However, results diverge from postulating a general rule that all bank mergers are associated with systemic risk and consequently support expansion and diversification fragility<sup>87</sup>. Instead, a differentiation between the levels of systemic risk contribution resulting from different types of mergers is highlighted, in addition to distinguishing between the auxiliary/contributory variables of firms, markets and deal criteria.

Our results show that systematic risk is negatively influenced by economic value addition (EVA), financial freedom (FinFR) and bank concentration, but positively associated with economic freedom (ECFR), return on assets (ROA) and Leverage. As EVA is regarding operating profit and negative of invested capital and the weighted average of the cost of capital, this proves that improvements in operating profit and well-controlled cost of capital can undoubtedly contribute to decreasing systematic risks. National bank deals, focused and diversified, appear to have less systematic risk generated in the realm of more financial freedom accompanied by moderate to high

---

<sup>87</sup> Weiß *et al.* (2014) hypothesise that they “strongly reject the charter value hypothesis and support the notion that consolidation in banking leads to a considerable destabilization of the financial system” without case studying and differentiating between factors and determinants of the merger deals.

concentration, i.e. fewer players in the market. In local deals, activity restrictions also have a significant role in decreasing systematic risk.

The association between systemic risk and all of regulatory and market and performance measures is more apparent and more significant in local/national than cross-border bank merges. Capital requirements, activity restrictions, bank concentration and economic and financial freedom, increase systemic risk contribution of individual banks upon merger announcements. Contrary to financial freedom, economic freedom proves to impede systemic risk in national bank mergers. Large banks contribute to increasing the systemic risk contribution of national bank mergers.

Profitability measures of return on assets and net operating profit are also positively associated with systemic risk. They are primarily reflecting improvements in profitability following a national (local) bank merger, with a majority of these deals to have been perceived as higher risk inflicting. Cost and operating efficiencies increase with systemic risk in national bank mergers, justifying banks success in enhancing economies of scales and operational efficiencies despite the primarily perceived risk (systemic) and capital shortfalls.

In the cross-border bank, size appears to have a positive influence by decreasing systemic risk contribution of banks acquiring another non-bank financial institution abroad. Return on assets significantly increases with the lower systemic risk in cross-border deals. This supports and materialises the concept of geographic diversification stability.

In cross-border bank mergers, real estate and investment target firms increase the systemic risk contribution, contrary to insurance targets. Scale efficiency is mostly accompanied by lowering systemic risk contributions in bank-insurance deals and to a lower extent bank-real estate deals, but the opposite is valid for a bank- diversified FIs and Bank-Investment mergers. Sustainability growth rate expresses significant improvement and decreases systemic risk contribution in all diversifying deals. Return on assets, leverage and net operating profit follow an opposite suite to SGR and return

on equity, in all diversifying deals. This mainly reflects the riskier deals (more substantial systemic risk contribution) have yielded higher returns and operating profits in the same year of the merger announcement.

During the 2008 financial crisis, the levels of systemic risk contribution are relatively comparable and quite similar among all types of target FIs, with a prevailing theme of systemic risk from bank-real estate mergers. However, between 2011 and 2012, bank-diversified targets mergers realised the maximum of systemic risk among all other types of bank M&As. Afterwards, from 2012 to 2014, SRISK from bank-diversified FI descends, and bank-insurance mergers surmount with a significant distinction (magnitude) from the rest of deal types. SRISK have settled, after 2014 with the dominance of systemic risk contribution from bank-insurance and bank-investment mergers. This reflects a) a consequence of the size and level of bank mergers transactions between 2007-2016, and the resultant beta and capital shortfall due to investors perception, during the crisis and the connection of the real estate sector bubble, and b) the regulation themes following the financial crisis that signalled ring-fencing against some industries (Vickers Report, 2011; Liikanen *et al.*, 2012; ECB, 2018; Detken *et al.*, 2018). Bank-investment and bank-insurance mergers have resurfaced as a more systemically risky strategy even after two years from the theoretical ending of the 2008-2011 crisis.

Results from a structural model that explores the endogeneity of risk variables and exogeneity of regulatory and market factors and different levels of FIs and markets reveal that activity restrictions, supervisory power and financial freedom are associated with decreasing systemic risk of banks following mergers. While economic freedom and higher market power with lower concentration boost systemic risk following mergers. At bank level, higher capital requirement and private monitoring policies enhance the risk profile of banks toward mergers risks. Enterprise value and sustainable growth prove to be assistive to decreasing idiosyncratic risk more evidently than year-end measures of profitability and leverage.

Target FIs' size has no significant impact on its systemic risk contribution. Similarly, the regulatory environment in the targets jurisdictions has little influence, except for capital requirements (CAPRQ). Therefore, results advance several implications;

- Policy implications: the adversative properties of bank mergers in respect of systemic risk require strict and innovative monitoring of bank mergers from the bidding level by both acquirers and targets, and regulators and competition supervisory bodies. Moreover, emphasis on regulators/governments intervention and role as it provides a stabilising factor of the markets and consecutively lower systemic risk even if the systematic idiosyncratic risk contribution was significant. However, such roles have to be well planned and scaled to avoid providing motives for banks to seek too-big-too-fail or too-big-to-discipline status.
- At financial institutions levels, they are recommended to avoid trapped capital and liquidity by efficiently utilising local balance sheet and strengthening them via implementing models that set diversification and netting benefits to determine capital reserves and to drive capital efficiency through the clarity on product-activity-geography diversification and focus. This contributes to successful ringfencing, decreases compliance costs and maximises returns and minimises several risks, including systemic risk.

## 4.6.1 Appendix

Table 4-15 SRISK contribution adjustment following a bank merger announcement and the role of payment method.

Delta SRISK	Cash		Cash and Stock		Cash or Stock		Stock		Undisclosed	
	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t	Coef.	P> t
Deal Value	-5,317.682***	0.000	60,435.93***	0.000	-495.25***	0.001	867.1996***	0.001	-5,405.993***	0.000
CAPRQ	53,700,000***	0.000	-84,300,000***	0.000	38,300,000***	0.000	-2,359,519	0.692	-16,300,000***	0.000
PRMONT	33,900,000***	0.000	-167,000,000***	0.000	55,200,000***	0.000	23,900,000***	0.000	5,699,286***	0.000
ACTRS	-1,916,929	0.441	18,100,000	0.452	-79,300,000***	0.000	18,800,000***	0.007	-19,900,000***	0.000
SPOWER	-14,900,000***	0.000	-91,700,000***	0.000	(omitted; adjusting for Multicollinearity)		33,300,000***	0.000	-21,300,000***	0.000
ECONOMIC FREEDOM	10,000,000***	0.000	-26,800,000***	0.000	153077.30	0.702	-20,200,000***	0.000	-7,953,547***	0.000
Financial Freedom	-5,457,286***	0.000	12,200,000***	0.000	-112,013.40***	0.026	3,024,089***	0.000	1,118,699***	0.000
Bank Concentration(5)	-1,737,737***	0.000	4,198,039***	0.000	-171,101	0.288	3,904,527***	0.000	-3,380,075***	0.000
Lerner Index	1,040,000,000***	0.000	-1,730,000,000***	0.000	7,386,261	0.472	328,000,000***	0.000	(omitted; adjusting for Multicollinearity)	
TFPCH	4,856,073***	0.000	-15,900,000***	0.000	-102,036.60	0.225	-2,176,344***	0.002	(omitted; adjusting for Multicollinearity)	
EVA	5,107,570***	0.000	-71,600,000***	0.000	-489,632.30***	0.000	827,760.80***	0.009	21,300,000***	0.000
SGR	23868.41	0.841	-1,430,107***	0.000	-137,123.50***	0.000	5,856.94	0.234	-696,832***	0.000
ROA (%)	-53,300,000***	0.000	-10,400,000	0.446	6,859,803***	0.000	-18,100,000***	0.000		
Leverage	5,695,791***	0.000	-25,900,000***	0.000	123,529.20	0.282	-16,900,000***	0.000	-1022403***	0.000
NOPAT	-4,299.93***	0.000	-24,677.09***	0.000	-1,909.03***	0.000	-347.48	0.650	-605.53***	0.000
OPPE	70.80***	0.000	-790.86***	0.000	-99.09***	0.000	-125.36***	0.000	-41.81***	0.000
Operating Margin	-733,946.20***	0.000	3,935,920***	0.000	1,059,856***	0.000	-728,723.20***	0.000	-1,054,139***	0.000
Efficiency Ratio	38,638.56***	0.036	-2,200,329***	0.000	285,712***	0.000	-582,233.50***	0.000	-2,789,573***	0.000
cons	-771,000,000	0.000	3920000000	0.000	388000000	0.000	625,000,000	0.000	1,440,000,000	0.000
No. of Obs	5,546		No. of Obs	6,279	No. of Obs	5,427	No. of Obs	8,714	No. of Obs	742
Prob>F	0.0000		Prob>F	0.0000	Prob>F	0.0000	Prob>F	0.0000	Prob>F	0.0000
R-Squared	0.5901		R-Squared	0.4813	R-Squared	0.2591	R-Squared	0.5220	R-Squared	0.8152
Root MSE	270000000		Root MSE	420000000	Adj. R-Squared	15000000	Adj. R-Squared	220000000	Adj. R-Squared	3000000

This table differentiates between the effects of payment type, used in settling the merger deal, and deal value among other regulatory and performance factors, on banks systemic risk. CAPRQ, PRMONT, ACTRS and SPOWER represents the proxies of regulatory regime towards capital requirement, monitoring, restrictions and supervisory power. Economic and Financial Freedom are Proxies for the financial sector freedom and the overall level of economic freedom. They are composite indices that are calculated by considering: business freedom, trade freedom, fiscal freedom, government spending, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, labour freedom. Bank Concentration calculates the proportion of the assets of the 5 biggest banks in a country to the total assets of all banks. ROA (%) is the return on Assets. Lerner Index is a measure of market power in the banking market. It compares output pricing and marginal costs (that is, mark-up). An increase in the Lerner index indicates a deterioration of the competitive conduct of financial intermediaries. Total Factor Productivity Change (TFPCH) is an index of efficiencies that is calculated by applying the ratio of differences on vectors of inputs and outputs. EVA represents the economic value addition or the enterprise value being an index based on the estimation of the Weighted Average Cost of Capital. SGR is the Sustainability Growth Rate. Leverage is the debt to equity ratio. NOPAT is the net operating profit after tax. OPPE is the Operating profit per employee OPPE, expressed as Operating Income(Loss)/(Number of Employees. Operating Margin Ratio measures a company's pricing strategy and operating efficiency, in percentage, is Operating Income (Losses) / Total Revenue \* 100. Efficiency Ratio (also known as Cost to Income Ratio) is an efficiency measure commonly used in the financial sector. The efficiency ratio measures costs compared to revenues. \*, \*\* and \*\*\* denote the levels of significance at 90%, 95% and 99% confidence levels.



## **5 Conclusion**

The financial sector has continuously experienced restructuring and reformation; either through re-regulation following crisis or deregulation following innovation. This synthetic cycle (Kane, 1981a, 1977) can be eased when economic and political powers find the optimal financial institution structure that can sustain a permanent, idiosyncratic and comprehensive risk-return enhanced status. One way of arriving at such status is through financial institutions consolidation: mergers and acquisitions.

Following the recent financial crisis (2008-2011), several regulatory reforms have been proposed, and several others have been in implementation. Despite the emphasis in banking literature on the regulation, stress, deregulation and re-regulation cycles, it is still inconclusive of how these regulations affect bank performance, productivity and risk. Some argue that tighter restrictions on bank activities are negatively associated with bank efficiency (Deli and Hasan, 2017b). While greater capital regulation is marginally and positively associated with bank efficiency (Barth *et al.*, 2013b). A strand of literature argues that different bank ownership structures react with different speeds to the change of the regulatory environment (Leightner and Lovell, 1998; Isik and Hassan, 2003), while another strand of the literature shows that ownership structure is neutral in terms of productivity growth. An important strand of literature questions the necessity of bank regulation and if its effect is diluted in regulatory arbitrage, where some institutions take advantage of multiple regulatory authorities at national and international levels (Boyer and Kempf, 2017). The literature also questions how industry practices and regulations can lead to facilitating interconnectedness and innovations of faster securitisation and consolidations with the objective of diversification and increased systematic risk, propagation and contagion risks and systemic risk.

Towards the ending of 2007, the world has suffered from a financial crisis mainly caused by excessive *securitisation* of *mortgages (subprime)*. For this study, the 2008 crisis is of concern due to the way it features banks involvement in other industries under the diversification paradigm, and its

risk impact systematically and systemically. The procyclical debate of regulation – difficulty – deregulation – crash has recently renewed. In the aftermath of the 2008-2011 crisis, several re-regulation has promoted ring-fencing and structural and operational separation of banks commercial activities from those of proprietary, investment and insurance businesses. This manner is transcribed as activities restrictions, in addition to higher capital requirements. Primarily because of securitisation role in the crisis widening and exacerbating. However, in less than a decade from these re-regulations, banks complained about the inability of generating enough profits that would act as buffers in times of crunches. A bill that passed the US Senate in 2018 confirms a move to allow to deduct cash held on behalf of clients from the calculation of the supplementary leverage. Doing so would lower the amount of capital the banks need to meet the requirements of the SLR, allowing them to yield more cash to shareholders in the form of dividends and share buybacks. This relaxation would destabilise the long-term resilience of the banking system and the broader economy, too (Hoeing, 2018). A most recent practical episode of this deregulation is in the most recent announcement of banks engaging in mortgage-backed securities again, across borders (Atlantic) too. Specifically, the UK Barclays started in May 2019 bundling US home loans, which was the same demonised sector of securitisation for its role in the 2008 crash (White and Cruise, 2019).

Furthermore, accompanying the performance pressure, technological advancements of the blockchain (Distributed Ledger) technology and its application in financial services, FinTech, has posed further motivations for innovation but even more significant challenges. Especially that the key drivers of FinTech are also the sources of impact on incumbent financial institutions and banks operating as Payment Institutions and Electronic Money Institutions. These drivers are *(i)* customer expectations/behaviour, *(ii)* competitive pressure, *(iii)* technological developments and *(iv)* regulatory changes (EBA, 2019). Henceforth, the pace of competitive pressure is forcing institutions to become more dynamic, but also adapt to changes and adopt innovative technologies. These dynamics are

materialising in strategies where Financial Institutions expand their products and services and enter to new markets through *(i)* leveraging cross-border services, *(ii)* requesting credit institution or third-party provider licences and/or *(iii)* approving the new services provided under the revised Payment Services Directive (PSD2)<sup>88</sup>. Such adoptions are proving to strongly suggest a relationship between the growth of the payments industry and the disintermediation theme in banking, especially when considering that existing credit institutions reported an adverse influence on their incomes from payments business lines. Evidence extends this impact (negative-sensitive) of FinTech to risk profiles of FIs and the way they measure and manage it. The rapid growth of FinTech with its multiple applications and interactions within the financial services sector deeply changes the risk profiles of institutions by generating new risks and/or amplifying some prevailing risks, prompting institutions to review their risk management frameworks and strategies. Risks are not a result of Information Technology only but extends to the use of biometrics, credit scoring using machine learning, automated investment advice, Distributed Ledger Technology (Blockchain) and trade finance (legal and compliance risks), customer identification and verification processes and mobile wallets and communications/connections techniques (EBA, 2018).

The renewed debate, combined with technological advancement and FinTech, has led to re-examining banks and financial institutions concerning their optimal structure and the activities to engage with and whether to internationalise or conglomerate if they are to maintain an adequate risk

---

<sup>88</sup> These include account aggregation services which aim to help consumers manage their finances by bringing all of their bank account data together in one place, and services that allow consumers to make payments in different ways online, without using a credit or debit card. PSD2 also introduces a number of new requirements around how firms treat their customers and handle their complaints, and the data they must report. It requires existing payment institutions and e-money institutions to be re-authorised or re-registered. Firms should consider whether they now need to seek authorisation or registration because of changes to the scope of regulation made by PSD2. This includes businesses providing account aggregation or online payment initiation services (FCA, 2017).

level. The bank merger literature diverges into two key aspects; diversification stability and diversification fragility. Although each hypothesis has its own merits, resolutions continue to be inconclusive. Few studies support banks to diversify their activities along with their geographic exposure (Goetz *et al.*, 2016; Ekkayokkaya *et al.*, 2009; Deng and Elyasiani, 2008; Bessler and Murtagh, 2002) but others suggest that geographic expansion exposes banks to more risk (Beitel *et al.*, 2004; DeLong, 2001a; Beitel and Schiereck, 2001; Weiß *et al.*, 2014), especially in cross-border deals (Giesecke and Kim, 2011; Furfine and Rosen, 2011).

Henceforth, this study starts by examining how mergers and acquisitions affect financial institutions' wealth maximisation and firms economic value in the immediate vicinity of the announcement and in the longer run of one and two years on the merger in **chapter 2**. In **chapter 3**, the impact of regulatory measures of capital requirements, activity restrictions, private monitoring and supervisory powers on efficiency and productivity is tested. Furthermore, this study analyses the systematic and systemic risks' and their determinants following and preceding FIs and bank mergers in **chapter 4**. This investigation synthesis, through its three empirical chapters, a triangulation to provide evidence on the market/product development strategies that are optimal for financial institutions growth. Namely, the wealth maximisation effect, the regulation and productivity effect and the risk effect when FIs pursue a specific consolidation activity-geography combination.

Results from **chapter 2** show that FIs mergers destroy value for the bidding firms pursuing a Market penetration strategy, but show no significant share value adjustment in the long run. Market and Product Development strategies enable value creation for shareholders both in the short and the long run. However, Diversification strategies do not appear to have a significant influence on acquiring FIs shareholders value both in the short and in the long run.

Megadeals, with a value of US\$10 Billion, appear to preserve more value for bidding FIs shareholders than those involved in a non-mega deal, by ten folds difference in BHARs. Financial

institutions mergers that are paid by \$US currency create significantly more value for bidders, in the short run than the ones paid for in Euro and British Pound. Payment in bidders' local currencies has a long-lasting value effect with BHARs being positive and significant until 230 days after the deal announcement. When the deal is paid for by "Cash" the short and long-horizon effect is significant and positive. However, deals paid by "Stock" or "Cash or Stock" exhibit negative small magnitude CARs. The 2008-2011 crisis appears to have a long-lasting negative effect on shareholders' value; BHARs during the financial crisis were consistently negative and 4 to 7 times greater than those of the same windows before the crisis.

Local bank to bank mergers creates shareholders value and can increase their liquidity and economic value in the short run. These deals enable bidding banks to increase returns (ROE) from lending (Loans to Deposits) and decrease credit risk along with the long-run share value increase. However, this is at the cost of deteriorating return on invested capital, liquidity and economic value. Bank to bank cross border mergers create shareholder value for bidders in the long run but is associated with high costs and higher risks (Loans to deposits and credit risk). It is most probably due to costs of cultural and procedural (regulations and regulators, organisational culture) differences leading to diminishing value. Cross border and US cross states Real Estate focused mergers create shareholders value and can enhance return on equity and economic value. However, their long-run shareholder value gain came at the cost of decreased liability and increased cost and expenses. Nevertheless, focused real estate mergers appear to be more successful. Insurance companies focused mergers can create value in the short horizon post-merger, only at the expense of lower liquidity and increased expenses.

Bidding banks in Latin America have the most active association of pre-announcement financial performance with shareholders value. Although their enhanced ROE and liquidity, Latin American focused bank mergers seem to operate high credit risk and provide little attention to economic value

addition and cost of capital. Australasian acquiring banks have enhanced liquidity along with share value in the long run along, decreasing other expenses and credit risk but at the higher cost of capital and lower return on equity and invested capital. European focused bank mergers have associated the short-term share value creation with a declining return on equity, liquidity and economic value. However, they also succeed in decreasing risk and capital to assets ratio. North American bank focused mergers can create shareholders value along with decreasing credit risk and other expenses. However, it is also associated with the increased cost to income ratios (operating) and lower liquidity. They are probably reflecting the decreased ability of banks to increase loans and income from them during consolidation (measures are announcement years'). Bank to bank mergers' economic value post-merger is driven mainly by an expansion in loans (Loans to T. Assets ratio) in North American and Australasian bidding banks. Shareholders value also drives long-run economic value for North American bank bidders. EVA is also negatively influenced by the broad base of loans compared to deposits, hence credit risk, and low net loans to assets in Australasian bank focused mergers.

On the regulation impact facets, results from **chapter 3** emphasise the negative impact of high capital buffers (Basel 3) and their impact on available funds for lending that forms banks' source of interest income. However, there exist positive associations in few economies where high capital requirements have reputational and confidence rewards that outweigh the losses from capital reserves like in North and Latin American countries. Official supervisory powers by regulators on banks drive productivity growth in all regions except Europe and Central Asia. Activity restrictions on real estate, insurance, and securities businesses, are negatively associated with productivity change in all Income level groups but High Income. Furthermore, Private Monitoring negatively influences productivity growth in all models, all regions and all income levels, groups. Results that lead to proposing the promotion of further corporate governance and establishing mechanisms that monitor and award institutions for systems and personnel standardisation self-auditing (Shehzad *et al.*, 2010).

Market volatility and Z-score appear to both drive technological change and scale efficiency growth, but negatively impact pure technical efficiency. Financial freedom enables scale efficiency change, while it impedes technological and pure technical efficiency changes. However, Concentration and market power affect all efficiencies negatively. Improvements in pure technical efficiency appear to be at the cost of equity value and profitability. However, ROA appears to accompany and enable technological change but not scale efficiency and overall efficiency. This resolution appears robust to a variety of model specifications that control for various country-specific characteristics and alternative estimation approaches. Allowing us to interpolate other factors affecting financial institutions' productivity and sustainability. Banks, scheduled to implement several regulatory reforms like Basel III (2013) along with current updates of the ring-fencing, will have to consider several factors to be prepared for productivity growth. Primarily, operational risk deliberation requires investing more in private monitoring. Secondly, counterparty credit risk and the size of off-balance-sheet activities that can be of lending nature, but securitised differently requires broader control, especially, because they formed two-thirds of losses in the recent financial crisis (BCBS, 2010a). Activity restrictions that were negatively associated with banks' productivity suggest modest relief of restrictions to enhance banks' productivity. Hence, financial regulators are required to enable banks' diversification as a 'productivity enhancement vehicle', but within the ring-fencing measures enacted recently.

The risk analysis of mergers in **chapter 4** find that bank mergers, internationally, are associated with systemic risk, and its components of idiosyncratic systematic risk and capital shortfalls measured by beta, beta\* and Long Run Marginal Capital Shortfalls consecutively. However, results diverge from postulating a general rule that all bank mergers are associated with systemic risk and depart from supporting a global theory of expansion or diversification fragility. Instead, distinguishing between the levels of systemic risk contribution resulting from different types of mergers is sought.

Systematic risk is negatively influenced by economic value addition (EVA), financial freedom (FinFR) and bank concentration, but positively associated with economic freedom (ECFR), return on assets (ROA) and Leverage. As EVA is regarding operating profit and negative of invested capital and the weighted average of the cost of capital, this proves that improvements in operating profit and well-controlled cost of capital can undoubtedly contribute to decreasing systematic risks. National bank deals, focused and diversified, appear to have less systematic risk generated in the realm of more financial freedom accompanied by moderate to high concentration, i.e. fewer players in the market. In local deals, activity restrictions also have a significant role in decreasing systematic risk.

The association between systemic risk and all of regulatory and market and performance measures is more evident and more significant in local/national than cross-border bank merges. Capital requirements, activity restrictions, bank concentration and economic and financial freedom, increase systemic risk contribution of individual banks upon merger announcements. Contrary to financial freedom that proves to be an impediment to systemic risk in national bank mergers. Increased financial freedom that allows mergers with activity diversification attributes and lower requirements on capital ratios support system stability and poses fewer threats to the banking sector and requires fewer funds allocation for the contingencies of system-wide crisis. Larger banks contribute to increasing the systemic risk contribution of national bank mergers.

Profitability measures of return on assets and net operating profit are also positively associated with systemic risk. They are primarily reflecting improvements in profitability following a national (local) bank merger, with a majority of these deals to have been perceived as higher risk inflicting. Cost and operating efficiencies increase with systemic risk in national bank mergers. They are mainly justifying banks success in enhancing economies of scales and operational efficiencies despite the primarily perceived risk (systemic) and capital shortfalls.

In the cross-border bank, size appears to have a positive influence by decreasing systemic risk contribution of banks acquiring another non-bank financial institution abroad. Return on assets significantly increases with the lower systemic risk in cross-border deals. This outcome supports and materialises the concept of geographic diversification stability.

In cross-border bank mergers, real estate and investment target firms increase the systemic risk contribution, contrary to insurance targets. Scale efficiency is mostly accompanied by lowering systemic risk contributions in bank-insurance deals and to a lower extent, bank-real estate deals, but the opposite is also true for a bank- diversified FIs and Bank-Investment mergers. Sustainability growth rate expresses significant improvement and decreases systemic risk contribution in all diversifying deals. Return on assets, leverage and net operating profit follow an opposite suite to SGR and return on equity, in all diversifying deals. This is a resolution that mainly reflects the riskier deals (more substantial systemic risk contribution) have yielded higher returns and operating profits in the same year of the merger announcement.

During the 2008 financial crisis, the levels of systemic risk contribution are relatively comparable and quite similar among all types of target FIs, with a prevailing theme of systemic risk from bank-real estate mergers. SRISK have settled after 2014, with the dominance of systemic risk contribution from bank-insurance and bank-investment mergers. Bank-investment and bank-insurance mergers have resurfaced as a more systemically risky strategy even after two years from the theoretical ending of the 2008-2011 crisis.

Target FIs' size has no significant impact on its systemic risk contribution. Similarly, the regulatory environment in the targets jurisdictions has little influence, except for capital requirements (CAPRQ).

Therefore, results advance several implications;

- a) Policy implications: the adversative properties of bank mergers in respect of systemic risk require strict and innovative monitoring of bank mergers from the bidding level by both acquirers and targets, and regulators and competition supervisory bodies.
- b) At financial institutions levels, they are recommended to avoid trapped capital and liquidity by efficiently utilising local balance sheet and strengthening them via implementing models that set diversification and netting benefits to determine capital reserves and to drive capital efficiency, through the clarity on product-activity-geography diversification and focus. This paradigm contributes to successful ringfencing, decreases compliance costs and maximises returns and minimises several risks, including systemic risk.

Variations in regional results emphasise on the need for regional and jurisdictional adaptations of any regulatory reform and the adoption of local assessment techniques. This localisation helps against regulatory arbitrage when customised to local conduct and in line with international guidelines simultaneously.

This research accentuates on the future role of innovation through market penetration strategies. There is a high likelihood that financial markets will witness the expansion of traditional banking models over the diversified ones, in the form of banks funding their retail loans by a more significant percentage of bank deposits rather than asset-backed securities. The rise of Financial Technology (FinTech) enables such activities, which would enable significant financial and informational efficiency when utilised alongside securitisation as a positive technique. Hence, highlighting the advantage of not discontinuing securitisation but building on it, conditioned by more prudence by lenders, more diligence by investors, and greater regulatory oversight through accompanying regulatory technology (RegTech) and encouraging a FinTech strategy of mergers and acquisitions.



## References List

- ACHARYA, V., ENGLE, R. & RICHARDSON, M. 2012. Capital shortfall: A new approach to ranking and regulating systemic risks. *American Economic Review*, 102, 59-64.
- ACHARYA, V., HASAN, I. & SAUNDERS, A. 2006. Should Banks Be Diversified? Evidence from Individual Bank Loan Portfolios. *The Journal of Business*, 79, 1355-1412.
- ACHARYA, V. V., PEDERSEN, L. H., PHILIPPON, T. & RICHARDSON, M. 2010. Measuring systemic risk. *The Review of Financial Studies*, 30, 2-47.
- ACHARYA, V. V., WACHTEL, P. & WALTER, I. 2009. International Alignment of Financial Sector Regulation. *Financial Markets, Institutions & Instruments*, 18, 188-190.
- ADRIAN, T. & BRUNNERMEIER, M. K. 2009. CoVar: a method for macroprudential regulation. *Federal Reserve Bank of New York Staff Report*, 348.
- ADRIAN, T. & BRUNNERMEIER, M. K. 2016. CoVaR. *American Economic Review*, 106, 1705-41.
- AEBI, V., SABATO, G. & SCHMID, M. 2012. Risk management, corporate governance, and bank performance in the financial crisis. *Journal of Banking & Finance*, 36, 3213-3226.
- AFFINITO, M. & POZZOLO, A. F. 2017. The interbank network across the global financial crisis: Evidence from Italy. *Journal of Banking & Finance*, 80, 90-107.
- AGÉNOR, P.-R. & EL AYNAOUI, K. 2010. Excess liquidity, bank pricing rules, and monetary policy. *Journal of Banking and Finance*, 34, 923 - 933.
- AGOSTINO, M. & MAZZUCA, M. 2011. Empirical investigation of securitisation drivers: the case of Italian banks. *The European Journal of Finance*, 17, 623-648.
- AKHAVEIN, J. D., BERGER, A. N. & HUMPHREY, D. B. 1997. The effects of megamergers on efficiency and prices: Evidence from a bank profit function. *REVIEW OF INDUSTRIAL ORGANIZATION*, 12, 95-139.
- AKHIGBE, A. & WHYTE, A. M. 2003. Changes in market assessments of bank risk following the Riegle-Neal Act of 1994. *Journal of Banking & Finance*, 27, 87-102.
- AL-MUHARRAMI, S., MATHEWS, K. & KHABARI, Y. 2006. Competitive conditions in the Arab Banking system. *Journal of Banking and Finance*, 30, 3487 - 3501.
- ALDASORO, I., DELLI GATTI, D. & FAIA, E. 2017. Bank networks: Contagion, systemic risk and prudential policy. *Journal of Economic Behavior & Organization*, 142, 164-188.
- ALFON, I., ARGIMON, I. & BASCUÑANA-AMBRÓS, P. 2004. *What determines how much capital is held by UK banks and building societies?*, Financial Services Authority London.
- ALLEN, F. & GALE, D. 2004. Competition and Financial Stability. *Journal of Money, Credit and Banking*, 36, 453-480.
- ALTUNBAS, Y., BINICI, M. & GAMBACORTA, L. 2018. Macroprudential policy and bank risk. *Journal of International Money and Finance*, 81, 203-220.
- ALTUNBAS, Y., GAMBACORTA, L. & MARQUES-IBANEZ, D. 2009. Securitisation and the bank lending channel. *European Economic Review*, 53, 996-1009.
- ALTUNBAS, Y. & IBANEZ, M. D. 2008. Mergers and acquisitions and bank performance in Europe: The role of strategic similarities. *Journal of Economics and Business*, 60, 204-222.

- ALTUNBAŞ, Y. & MARQUÉS, D. 2008. Mergers and acquisitions and bank performance in Europe: The role of strategic similarities. *Journal of Economics and Business*, 60, 204-222.
- AMEL, D., BARNES, C., PANETTA, F. & SALLES, C. 2004. Consolidation and efficiency in the financial sector: A review of the international evidence. *Journal of Banking & Finance*, 28, 2493-2519.
- AMEMIYA, T. 1977. The maximum likelihood and the nonlinear three-stage least squares estimator in the general nonlinear simultaneous equation model. *Econometrica: Journal of the Econometric Society*, 955-968.
- AMIHUD, Y., DELONG, G. L. & SAUNDERS, A. 2002. The effects of cross-border bank mergers on bank risk and value. *Journal of International Money and Finance*, 21, 857-877.
- AMIHUD, Y. & LEV, B. 1981. Risk reduction as a managerial motive for conglomerate mergers. *The bell journal of economics*, 605-617.
- ANDRADE, G. & STAFFORD, E. 2004. Investigating the economic role of mergers. *Journal of Corporate Finance*, 10, 1-36.
- ANDRIOSOPOULOS, D. & YANG, S. 2015. The impact of institutional investors on mergers and acquisitions in the United Kingdom. *Journal of Banking & Finance*, 50, 547-561.
- ANGELIDES, P. & THOMAS, B. 2011. *The financial crisis inquiry report: Final report of the national commission on the causes of the financial and economic crisis in the united states (revised corrected copy)*, Government Printing Office.
- ANNE, B., W., S. L. & JOSEPH, W. 2010. The Effect of Private Information and Monitoring on the Role of Accounting Quality in Investment Decisions\*. *Contemporary Accounting Research*, 27, 17-47.
- ANSOFF, H. I. 1958. A Model for Diversification. *Management Science*, 4, 392-414.
- ANSOFF, H. I. 1980. Strategic issue management. *Strategic Management Journal*, 1, 131-148.
- ANSOFF, I. 1957. Strategies for Diversification", Harvard Business Review, September-October.
- ARISS, R. 2009. Competition behavior in Middle East and North African banking system. *The Quarterly Review of Economics and Finance*.
- ARMITAGE, S. 1995. Event study methods and evidence on their performance. *Journal of Economic Surveys*, 9, 25.
- ASHTA, A. 2008. Sustainable growth rates: refining a measure. *Strategic Change*, 17, 207-214.
- ASIMAKOPOULOS, I. & ATHANASOGLU, P. P. 2013. Revisiting the merger and acquisition performance of European banks. *International Review of Financial Analysis*, 29, 237-249.
- ATHANASOGLU, P. P., BRISSIMIS, S. N. & DELIS, M. D. 2008. Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money*, 18, 121-136.
- ATHANASOGLU, P. P., DANIILIDIS, I. & DELIS, M. D. 2014. Bank procyclicality and output: Issues and policies. *Journal of Economics and Business*, 72, 58-83.
- ATKESON, A. G., EISFELDT, A. L. & WEILL, P.-O. 2017. Measuring the financial soundness of U.S. firms, 1926–2012. *Research in Economics*, 71, 613-635.
- AYADI, R. 2019. Changing Role of Banks in the Financial System. *Banking Business Models*. Springer.

- AYADI, R., BOUSSEMART, J.-P., LELEU, H. & SAIDANE, D. 2013. Mergers and Acquisitions in European banking higher productivity or better synergy among business lines? *Journal of Productivity Analysis*, 39, 165-175.
- AYADI, R., NACEUR, S. B., CASU, B. & QUINN, B. 2016a. Does Basel compliance matter for bank performance? *Journal of Financial Stability*, 23, 15-32.
- AYADI, R., NACEUR, S. B., CASU, B. & QUINN, B. 2016b. Does Basel compliance matter for bank performance? *Journal of Financial Stability*, 23, 15-32.
- AYSAN, A. F. & CEYHAN, S. P. 2008. Structural Change and the Efficiency of Banking In Turkey: Does Ownership Matter?
- AYUSO, J., PÉREZ, D. & SAURINA, J. 2004. Are capital buffers pro-cyclical?: Evidence from Spanish panel data. *Journal of Financial Intermediation*, 13, 249-264.
- BAGLIANO, F. C., DALMAZZO, A. & MARINI, G. 2000a. Bank competition and ECB's monetary Policy. *Journal of Banking and Finance*, 24, 967 - 983.
- BAGLIANO, F. C., DALMAZZO, A. & MARINI, G. 2000b. Bank competition and ECB's monetary policy. *Journal of Banking & Finance*, 24, 967-983.
- BAKIR, C. 2017. How can interactions among interdependent structures, institutions, and agents inform financial stability? What we have still to learn from global financial crisis. *Policy Sciences*, 50, 217-239.
- BALL, R. & BROWN, P. 1968. An empirical evaluation of accounting income numbers. *Journal of Accounting Research*, 6, 159-178.
- BALUCH, F., MUTENGA, S. & PARSONS, C. 2011. Insurance, Systemic Risk and the Financial Crisis. *The Geneva Papers on Risk and Insurance - Issues and Practice*, 36, 126-163.
- BALVERS, R. J. & HUANG, D. 2009. Money and the C-CAPM. *Journal of Financial and Quantitative Analysis*, 44, 337-368.
- BANK, W. 2019. *The World Bank Atlas method - detailed methodology* [Online]. The World Bank. Available: <https://datahelpdesk.worldbank.org/knowledgebase/articles/378832-what-is-the-world-bank-atlas-method> [Accessed 15/04/2019 2019].
- BARBER, B. M. & LYON, J. D. 1997. Detecting long-run abnormal stock returns: The empirical power and specification of test statistics. *Journal of Financial Economics*, 43, 341-372.
- BARNEY, J. 1991. Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17, 99-120.
- BARTH, J., CAPRIO, G. & LEVINE, R. 2008a. *Rethinking bank regulation : Till angels govern*, Cambridge, Cambridge University Press
- BARTH, J., CAPRIO, G. J. & LEVINE, R. 2001a. The regulation and supervision of banks around the world - a new database. *World Bank Policy Research Working Paper Number 2588, April 2001*. World Bank.
- BARTH, J., CAPRIO, G. J. & LEVINE, R. 2004. Bank regulation and supervision: what works best? 13, 205 - 248.
- BARTH, J., CAPRIO, G. J. & LEVINE, R. 2008b. Bank Regulations Are Changing: For Better or Worse? : World Bank, Development Research Group.
- BARTH, J., CAPRIO, G. J. & LEVINE, R. 2008c. *Rethinking bank regulation: Till angels govern*, Cambridge University Press.

- BARTH, J. R., A., P. P. & C., W. 2015. The Dodd-Frank Act: Key Features, Implementation Progress, and, Financial System Impact. *The First Great Financial Crisis of the 21st Century*.
- BARTH, J. R., CAPRIO, G., JR. & LEVINE, R. 2008d. Bank Regulations Are Changing: For Better or Worse? : World Bank, Development Research Group.
- BARTH, J. R., CAPRIO, G. & LEVINE, R. 2008e. *Rethinking bank regulation: Till angels govern*, Cambridge University Press.
- BARTH, J. R., CAPRIO, G. J. & LEVINE, R. 2001b. Banking systems around the globe: Do regulations and ownership affect performance and stability? Mishkin: University of Chicago Press.
- BARTH, J. R., CAPRIO, G. J. & LEVINE, R. 2008f. *Bank regulations are changing: for better or worse?*, The World Bank.
- BARTH, J. R., CAPRIO JR, G. & LEVINE, R. 2013a. Bank regulation and supervision in 180 countries from 1999 to 2011. *Journal of Financial Economic Policy*, 5, 111-219.
- BARTH, J. R., LIN, C., MA, Y., SEADE, J. & SONG, F. M. 2013b. Do bank regulation, supervision and monitoring enhance or impede bank efficiency? *Journal of Banking & Finance*, 37, 2879-2892.
- BATTISTON, S. & MARTINEZ-JARAMILLO, S. 2018. Financial networks and stress testing: Challenges and new research avenues for systemic risk analysis and financial stability implications. Elsevier.
- BAUR, D. G. 2012. Financial contagion and the real economy. *Journal of Banking & Finance*, 36, 2680-2692.
- BCBS 2010a. Basel III: A global regulatory framework for more resilient banks and banking systems. *In: SUPERVISION*, B. C. O. B. (ed.). Bank for International Settlements.
- BCBS, B. C. O. B. S. 2010b. Basel III: A global regulatory framework for more resilient banks and banking systems. Bank for International Settlements.
- BCBS, B. C. O. B. S. 2015. Guidelines for identifying and dealing with weak banks. *In: SETTLEMENTS*, B. F. I. (ed.) ISBN 978-92-9197-100-8 (Online: Bank for International Settlements).
- BECCALLI, E. & FRANTZ, P. 2009. M&A operations and performance in banking. *Journal of Financial Services Research*, 36, 203.
- BECK, T. & DEMIRGÜÇ-KUNT, A. 2009. Financial institutions and markets across countries and over time: Data and analysis. World Bank Policy.
- BECK, T., DEMIRGÜÇ-KUNT, A. & LEVINE, R. 2006. Bank concentration, competition, and crises: First results. *Journal of Banking & Finance*, 30, 1581-1603.
- BEITEL, P. & SCHIERECK, D. 2001. Value creation at the ongoing consolidation of the European Banking Markets.
- BEITEL, P., SCHIERECK, D. & WAHRENBURG, M. 2004. Explaining M&A success in european banks. *European financial management*, 10, 109-139.
- BELLOTTI, X. & WILLIAMS, J. 2008. Do win-win outcomes exist? A study of cross-border M&A transactions in emerging markets. *Comparative Economic Studies*, 50, 274-296.
- BELTRATTI, A. & STULZ, R. M. 2012. The credit crisis around the globe: Why did some banks perform better? *Journal of Financial Economics*, 105, 1-17.
- BERGER, A., EL GHOUL, S., GUEDHAMI, O. & ROMAN, R. 2013. Bank internationalization and risk taking. Available at SSRN.

- BERGER, A. N. 2000. The integration of the financial services industry: Where are the efficiencies? *North American Actuarial Journal*, 4, 25-45.
- BERGER, A. N., DEMSETZ, R. S. & STRAHAN, P. E. 1999. The consolidation of the financial services industry: Causes, consequences, and implications for the future. *Journal of Banking & Finance*, 23, 135-194.
- BERGER, A. N., HASAN, I. & ZHOU, M. 2010. The effects of focus versus diversification on bank performance: Evidence from Chinese banks. *Journal of Banking & Finance*, 34, 1417-1435.
- BERGER, A. N. & HUMPHREY, D. B. 1994. Bank Scale Economies, Mergers, Concentration, and Efficiency: The U.S. Experience.
- BERGER, A. N., MILLER, N. H., PETERSEN, M. A., RAJAN, R. G. & STEIN, J. C. 2005. Does function follow organizational form? Evidence from the lending practices of large and small banks. *Journal of Financial Economics*, 76, 237-269.
- BERGER, A. N., MOLYNEUX, P. & WILSON, J. O. S. 2012. *The Oxford handbook of banking*, Oxford, Oxford University Press.
- BERGER, P. G. & OFEK, E. 1995. Diversification's effect on firm value. *Journal of Financial Economics*, 37, 39-65.
- BERNDT, A. & GUPTA, A. 2009. Moral hazard and adverse selection in the originate-to-distribute model of bank credit. *Journal of Monetary Economics*, 56, 725-743.
- BESSLER, W. & MURTAGH, J. P. 2002. The stock market reaction to cross-border acquisitions of financial services firms: an analysis of Canadian banks. *Journal of International Financial Markets, Institutions and Money*, 12, 419-440.
- BHAGAT, S., MALHOTRA, S. & ZHU, P. 2011. Emerging country cross-border acquisitions: Characteristics, acquirer returns and cross-sectional determinants. *Emerging Markets Review*, 12, 250-271.
- BILLIO, M., GETMANSKY, M., LO, A. W. & PELIZZON, L. 2012. Econometric measures of connectedness and systemic risk in the finance and insurance sectors. *Journal of Financial Economics*, 104, 535-559.
- BISIAS, D., FLOOD, M., LO, A. W. & VALAVANIS, S. 2012. A survey of systemic risk analytics. *Annu. Rev. Financ. Econ.*, 4, 255-296.
- BLOOMBERG. 2017. *IPO Timelines Are Cut by 80% After SEC's Private Filing Decision* [Online]. Bloomberg. Available: <https://www.bloomberg.com/news/articles/2017-12-22/ipo-timelines-are-cut-by-80-after-sec-s-private-filing-decision> [Accessed March 2019].
- BOEHMER, E., MASUMECCI, J. & POULSEN, A. B. 1991. Event-study methodology under conditions of event-induced variance. *Journal of Financial Economics*, 30, 253-272.
- BOLLERSLEV, T. Glossary to ARCH (GARCH). *Volatility and Time Series Econometrics: Essays in Honour of Robert F. Engle*, 2009. Citeseer.
- BONIN, J. P., HASAN, I. & WACHTEL, P. 2005. Bank performance, efficiency and ownership in transition countries. *Journal of Banking & Finance*, 29, 31-53.
- BORIO, C., FURFINE, C. & LOWE, P. 2001. Procyclicality of the financial system and financial stability: issues and policy options. *BIS papers*, 1, 1-57.
- BOSTIC, R., GABRIEL, S. & PAINTER, G. 2009. Housing wealth, financial wealth, and consumption: New evidence from micro data. *Regional Science and Urban Economics*, 39, 79-89.
- BOUBAKRI, N., COSSET, J.-C. & GUEDHAMI, O. 2005. Liberalization, corporate governance and the performance of privatized firms in developing countries. *Journal of Corporate Finance*, 11, 767-790.

- BOYD, J. H. & DE NICOLÒ, G. 2005. The theory of bank risk taking and competition revisited. *Journal of Finance*, 60, 1329-1343.
- BOYD, J. H., DE NICOLÒ, G. & LOUKOIANOVA, E. Banking crises and crisis dating: theory and evidence. International Monetary Fund Working Paper, 2009 International Monetary Fund (IMF). 1-50.
- BOYD, J. H. & PRESCOTT, E. C. 1986. Financial intermediary-coalitions. *Journal of Economic Theory*, 38, 211-232.
- BOYER, P. & KEMPF, H. 2016. Regulatory Arbitrage and the Efficiency of Banking Regulation. *BAFFI CAREFIN Centre*.
- BOYER, P. C. & KEMPF, H. 2017. Regulatory arbitrage and the efficiency of banking regulation. *Journal of Financial Intermediation*.
- BOYER, P. C. & PONCE, J. 2012. Regulatory capture and banking supervision reform. *Journal of Financial Stability*, 8, 206-217.
- BRICKLEY, J. A., LINCK, J. S. & SMITH, C. W. 2003. Boundaries of the firm: evidence from the banking industry. *Journal of Financial Economics*, 70, 351-383.
- BROOKS, C. 2013. *Introductory econometrics for finance*, Cambridge university press.
- BROWN, S. J. & WARNER, J. B. 1980. Measuring security price performance. *Journal of Financial Economics*, 8, 205-258.
- BROWN, S. J. & WARNER, J. B. 1985. Using daily stock returns - the case of event studies. *Journal of Financial Economics*, 14, 3-31.
- BROWNLEES, C. & ENGLE, R. 2012. Volatility, correlation and tails for systemic risk measurement. *Available at SSRN 1611229*.
- BROWNLEES, C. & ENGLE, R. F. 2017. SRISK: A Conditional Capital Shortfall Measure of Systemic Risk. *The Review of Financial Studies*, 30, 48-79.
- BRUN, M., FRAISSE, H. & THESMAR, D. 2013. The Real Effects of Bank Capital Requirements. *Débats économiques et financiers - 8*. Paris: Autorité de Contrôle Prudentiel - Banque de France.
- BRUNNERMEIER, M., CROCKETT, A., GOODHART, C., HELMWIG, M., PERSUAD, A. & SHIN, H. 2009. The fundamental principles of financial regulation. *Geneva Reports on the World Economy*. ICMB and CEPR.
- BRUNNERMEIER, M. K. & PEDERSEN, L. H. 2009. Market Liquidity and Funding Liquidity. *The Review of Financial Studies*, 22, 2201-2238.
- BUCKLEY, P. J., CLEGG, L. J., CROSS, A. R., LIU, X., VOSS, H. & ZHENG, P. 2007. The determinants of Chinese outward foreign direct investment. *Journal of International Business Studies*, 38, 499-518.
- CABALLERO, R. J. & KRISHNAMURTHY, A. 2008. Collective Risk Management in a Flight to Quality Episode. *the Journal of Finance*, 63, 2195-2230.
- CALMÈS, C. & THÉORET, R. 2014. Bank systemic risk and macroeconomic shocks: Canadian and U.S. evidence. *Journal of Banking & Finance*, 40, 388-402.
- CALOMIRIS, C. 2009a. Financial innovation, regulation, and reform. 29.
- CALOMIRIS, C. W. 2006. *US bank deregulation in historical perspective*, Cambridge University Press.
- CALOMIRIS, C. W. 2009b. Financial innovation, regulation, and reform. *Globalization and Growth*, 47.

- CAMPA, J. M. & HERNANDO, I. 2004. Shareholder value creation in European M&As. *European financial management*, 10, 47-81.
- CAMPA, J. M. & HERNANDO, I. 2006. M&A performance in the European financial industry. *Journal of Banking & Finance*, 30, 3367-3392.
- CAPON, N., FARLEY, J. U. & HOENIG, S. 1990. Determinants of Financial Performance: A Meta-Analysis. *Management Science*, 36, 1143-1159.
- CARBO-VALVERDE, S., KANE, E. J. & RODRIGUEZ-FERNANDEZ, F. 2012. Regulatory Arbitrage in Cross-Border Banking Mergers within the EU. *Journal of Money, Credit and Banking*, 44, 1609-1629.
- CARLETTI, E., HARTMANN, P. & SPAGNOLO, G. 2007. Bank mergers, competition, and liquidity. *Journal of Money, Credit and Banking*, 39, 1067-1105.
- CAROW, K. A. & KANE, E. J. 2002. Event-study evidence of the value of relaxing long-standing regulatory restraints on banks, 1970–2000. *The Quarterly Review of Economics and Finance*, 42, 439-463.
- CARPENTER, D. H. & MURPHY, M. M. Permissible securities activities of commercial banks under the Glass-Steagall Act (GSA) and the Gramm-Leach-Bliley Act (GLBA). 2010. Congressional Research Service, Library of Congress.
- CARTWRIGHT, P. 2009. Retail depositors, conduct of business and sanctioning. *Journal of Financial regulation and Compliance*, 17, 302-317.
- CARUANA, J. Shareholder value and stability in banking: Is there a conflict? Speech by the General Manager, Bank for International Settlements, Morgan Stanley European Financials Conference, London, 2012. 1-11.
- CASU, B., DONTIS-CHARITOS, P., STAIKOURAS, S. & WILLIAMS, J. 2015. Diversification, size and risk: The case of bank acquisitions of nonbank financial firms. *European financial management*, n/a-n/a.
- CASU, B., FERRARI, A., GIRARDONE, C. & WILSON, J. O. S. 2016. Integration, productivity and technological spillovers: Evidence for eurozone banking industries. *European Journal of Operational Research*, 255, 971-983.
- CASU, B., GIRARDONE, C. & MOLYNEUX, P. 2004a. Productivity change in European banking: A comparison of parametric and non-parametric approaches. 28, 2521 - 2540.
- CASU, B., GIRARDONE, C. & MOLYNEUX, P. 2004b. Productivity change in European banking: A comparison of parametric and non-parametric approaches. *Journal of Banking & Finance*, 28, 2521-2540.
- CAVES, D. W., LAURITS R., C. & W. ERWIN, D. 1982. The economic theory of index numbers and the measurement of input, output, and productivity. *Econometrica: Journal of the Econometric Society*, 1393-1414.
- CHAN-LAU, J. A., ESPINOSA, M., GIESECKE, K. & SOLÉ, J. A. 2009. Assessing the systemic implications of financial linkages. *Global Financial Stability Report*. International Monetary Fund.
- CHAN, Y.-S., GREENBAUM, S. I. & THAKOR, A. V. 1986. Information reusability, competition and bank asset quality. *Journal of Banking & Finance*, 10, 243-253.
- CHATTERJEE, S., LUBATKIN, M. H., SCHWEIGER, D. M. & WEBER, Y. 1992. Cultural differences and shareholder value in related mergers: Linking equity and human capital. *Strategic Management Journal*, 13, 319-334.
- CHEN, S. & DODD, J. L. 1997. Economic Value Added (EVA): An Empirical Examination Of A New Corporate Performance Measure. *Journal of Managerial Issues*, 9, 318-333.

- CHEN, V. Z., HOBDARI, B. & ZHANG, Y. 2018. Blockholder heterogeneity and conflicts in cross-border acquisitions. *Journal of Corporate Finance*.
- CHEN, Z. & TAN, J. 2011. Does bancassurance add value for banks? – Evidence from mergers and acquisitions between European banks and insurance companies. *Research in International Business and Finance*, 25, 104-112.
- CHEVALLIER, J. 2012. Global imbalances, cross-market linkages, and the financial crisis: A multivariate Markov-switching analysis. *Economic Modelling*, 29, 943-973.
- CHILD, J. & RODRIGUES, S. B. 2015. The Internationalization of Chinese Firms: A Case for Theoretical Extension? *Management and Organization Review*, 1, 381-410.
- CHONG, B. S. 1991. The Effects of Interstate Banking on Commercial Banks' Risk and Profitability. *The Review of Economics and Statistics*, 73, 78-84.
- CHORTAREAS, G. E., GIRARDONE, C. & VENTOURI, A. 2012. Bank supervision, regulation, and efficiency: Evidence from the European Union. *Journal of Financial Stability*, 8, 292-302.
- CHRISTOPH, K. & CHRISTIAN, K. 2017. Systemic Risk in Financial Markets: How Systemically Important Are Insurers? *Journal of Risk and Insurance*, 0.
- CIHAK, M., DEMIRGÜÇ-KUNT, A., MARTINEZ PERIA, M. S. & MOHSENI-CHERAGHLOU, A. 2013a. Bank regulation and supervision in the context of the global crisis. *Journal of Financial Stability*, 9, 733-746.
- CIHAK, M., DEMIRGÜÇ-KUNT, A., PERIA, M. S. M. & MOHSENI-CHERAGHLOU, A. 2013b. Bank regulation and supervision in the context of the global crisis. *Journal of Financial Stability*, 9, 733-746.
- CLAESSENS, S. & VAN HOREN, N. 2015. The impact of the global financial crisis on banking globalization. *IMF Economic Review*, 63, 868-918.
- COELLI, T. J., RAO, D. S. P., O'DONNELL, C. J. & BATTESE, G. E. 2005. *An introduction to efficiency and productivity analysis*, Springer Science & Business Media.
- COELLI, T. J. I. 1996. A guide to DEAP Version 2.1; A Data Envelopment Analysis (computer) Program.
- COOPER, D. & DYNAN, K. 2014. Wealth effects and macroeconomic dynamics. *Journal of Economic Surveys*, 30, 34-55.
- CORDELLA, T. & YEYATI, E. L. 2002. Financial opening, deposit insurance, and risk in a model of banking competition. *European Economic Review*, 46, 471-485.
- CORNETT, M. M., HOVAKIMIAN, G., PALIA, D. & TEHRANIAN, H. 2003. The impact of the manager-shareholder conflict on acquiring bank returns. *Journal of Banking & Finance*, 27, 103-131.
- CORNETT, M. M., MCNUTT, J. J. & TEHRANIAN, H. 2006. Performance Changes around Bank Mergers: Revenue Enhancements versus Cost Reductions. *Journal of Money, Credit and Banking*, 38, 1013-1050.
- CORRADO, C. J. 1989. A nonparametric test for abnormal security-price performance in event studies. *Journal of Financial Economics*, 23, 385-395.
- CORZO, T., LAZCANO, L., MÁRQUEZ, J., GISMERA, L. & LUMBRERAS, S. 2017. Systematic Risk from a Corporate Structural Model Approach: From Merton 1974 to Merton 2013.
- COWAN, A. R. 1992. Nonparametric event study tests. *Review of Quantitative Finance and Accounting*, 2, 343-358.

- CROCKETT, A. 2000. Marrying the micro- and macro-prudential dimensions of financial stability. Bank for International Settlement.
- CURI, C., LOZANO-VIVAS, A. & ZELENYUK, V. 2015. Foreign bank diversification and efficiency prior to and during the financial crisis: Does one business model fit all? *Journal of Banking & Finance*, 61, S22-S35.
- DAMANPOUR, F. & GOPALAKRISHNAN, S. 2001. The dynamics of the adoption of product and process innovations in organizations. *Journal of management studies*, 38, 45-65.
- DANCER, W. T. & POWELL, D. 2018. Dodd-Frank Repeal: Assessing the Change in the Day-To-Day Activities of Financial Institutions. *Journal of Accounting & Finance (2158-3625)*, 18.
- DANIELSSON, J. & SHIN, H. S. 2003. Endogenous risk. *Modern risk management: A history*, 297-316.
- DANIELSSON, J., SHIN, H. S. & ZIGRAND, J.-P. 2012. Endogenous and systemic risk. *Quantifying systemic risk*. University of Chicago Press.
- DE BANDT, O. & HARTMANN, P. 2000. Systemic risk: a survey.
- DE CARVALHO, F. J. C., DE PAULA, L. F. & WILLIAMS, J. 2012. Banking in Latin America. In: BERGER, A. N., MOLYNEUX, P. & WILSON, J. O. S. (eds.) *The Oxford Handbook of Banking*. Oxford: Oxford Press Library.
- DE GRAUWE, P. 2010. Crisis in the eurozone and how to deal with it. *CEPS Policy Brief*.
- DE HAAS, R. & VAN LELYVELD, I. 2014. Multinational banks and the global financial crisis: Weathering the perfect storm? *Journal of Money, Credit and Banking*, 46, 333-364.
- DE JONGHE, O. 2010. Back to the basics in banking? A micro-analysis of banking system stability. *Journal of Financial Intermediation*, 19, 387-417.
- DE MEZA, D. & WEBB, D. 1990. Risk, adverse selection and capital market failure. *The Economic Journal*, 100, 206-214.
- DE NICOLÓ, M. G. & LUCCHETTA, M. 2009. *Financial intermediation, competition, and risk: a general equilibrium exposition*, International Monetary Fund.
- DE, S. & JINDRA, J. 2012. Why newly listed firms become acquisition targets. *Journal of Banking & Finance*, 36, 2616-2631.
- DELI, Y. D. & HASAN, I. 2017a. Real effects of bank capital regulations: Global evidence. *Journal of Banking & Finance*, 82, 217-228.
- DELI, Y. D. & HASAN, I. 2017b. Real effects of bank capital regulations: Global evidence. *Journal of Banking & Finance*, 82, 217-228.
- DELIS, M., MOLYNEUX, P. & PASIOURAS, F. 2011a. Regulations and productivity growth in banking: evidence from transition economies. *Journal of Money, Credit and Banking*, 43, 735 - 764.
- DELIS, M. D., MOLYNEUX, P. & PASIOURAS, F. 2011b. Regulations and Productivity Growth in Banking: Evidence from Transition Economies. *Journal of Money, Credit and Banking*, 43, 735-764.
- DELONG, G. 2003. Does long-term performance of mergers match market expectations? Evidence from the US banking industry. *Financial Management (Blackwell Publishing Limited)*, 32, 5.
- DELONG, G. L. 2001a. Focusing versus diversifying bank mergers: Analysis of market reaction and long-term performance
- DELONG, G. L. 2001b. Stockholder gains from focusing versus diversifying bank mergers. *Journal of Financial Economics*, 59, 221-252.

- DEMIRGÜÇ-KUNT, A. & DETRAGIACHE, E. 2010. Basel Core Principles and Bank Risk; Does compliance matter? *IMF Working Paper*. International Monetary Fund.
- DEMIRGÜÇ-KUNT, A. & DETRAGIACHE, E. 2011. Basel Core Principles and bank soundness: Does compliance matter? *Journal of Financial Stability*, 7, 179-190.
- DEMIRGÜÇ-KUNT, A., DETRAGIACHE, E. & TRESSEL, T. 2008. Banking on the principles: Compliance with Basel Core Principles and bank soundness. *Journal of Financial Intermediation*, 17, 511-542.
- DEMIRGÜÇ-KUNT, A. & HUIZINGA, H. 2000. Financial structure and bank profitability. *World Bank Policy Research Working Paper*.
- DEMIRGÜÇ-KUNT, A. & HUIZINGA, H. 2010. Bank activity and funding strategies: The impact on risk and returns. *Journal of Financial Economics*, 98, 626-650.
- DEMIRGÜÇ-KUNT, A., LAEVEN, L. & LEVINE, R. 2003. The Impact of bank regulations, concentration and institutions on bank margins. World Bank Policy Research.
- DEMIRGÜÇ-KUNT, A. & MARTÍNEZ PERÍA, M. S. 2010. A framework for analyzing competition in the banking sector: an application to the case of Jordan.
- DEMSETZ, R. S. & STRAHAN, P. E. 1997. Diversification, Size, and Risk at Bank Holding Companies. *Journal of Money, Credit and Banking*, 29, 300-313.
- DEMYANYK, Y., OSTERGAARD, C. & SØRENSEN, B. E. 2007a. U.S. banking deregulation, small businesses, and interstate insurance of personal income. *Journal of Finance*, 62, 2763-2801.
- DEMYANYK, Y., OSTERGAARD, C. & SØRENSEN, B. E. 2007b. US banking deregulation, small businesses, and interstate insurance of personal income. *the Journal of Finance*, 62, 2763-2801.
- DENG, S. & ELYASIANI, E. 2008. Geographic Diversification, Bank Holding Company Value, and Risk. *Journal of Money, Credit and Banking*, 40, 1217-1238.
- DENG, S. E., ELYASIANI, E. & MAO, C. X. 2007. Diversification and the cost of debt of bank holding companies. *Journal of Banking & Finance*, 31, 2453-2473.
- DENIS, D. J., DENIS, D. K. & SARIN, A. 1997. Agency Problems, Equity Ownership, and Corporate Diversification. *the Journal of Finance*, 52, 135-160.
- DESS, G. G. & DAVIS, P. S. 1984. Porter's (1980) generic strategies as determinants of strategic group membership and organizational performance. *Academy of management journal*, 27, 467-488.
- DETKEN, C., FAHR, S. & LANG, J. H. 2018. Predicting the likelihood and severity of financial crises over the medium term with a cyclical systemic risk indicator. *Financial Stability Review*.
- DEYOUNG, R. 2012. Banking in the United States. In: BERGER, A. N., MOLYNEUX, P. & WILSON, J. O. S. (eds.) *Oxford Handbooks Online*. Oxford.
- DEYOUNG, R., EVANOFF, D. D. & MOLYNEUX, P. 2009. Mergers and acquisitions of financial institutions: A review of the post-2000 literature. *Journal of Financial Services Research*, 36, 87-110.
- DIAMOND, D. W. 1984. Financial Intermediation and Delegated Monitoring. *The Review of Economic Studies*, 51, 393-414.
- DODD-FRANCK ACT 2010. Wall Street Reform and Consumer Protection Act. *Public Law 111–203*, 124.
- DOLLEY, J. 1933. Characteristics and procedures of common stock split-ups. *Harvard Business Review*, 11, 316-327.

- DONTIS-CHARITOS, P., MOLYNEUX, P. & STAIKOURAS, S. K. 2011. Does the stock market compensate banks for diversifying into the insurance business? *Financial Markets, Institutions & Instruments*, 20, 1-28.
- DOYTCH, N. & CAKAN, E. 2011. Growth effects of mergers and acquisitions: a sector-level study of OECD countries. *Journal of Applied Economics and Business Research*, 1, 120-129.
- DRAKE, L., HALL, M. J. B. & SIMPER, R. 2006. The impact of macroeconomic and regulatory factors on bank efficiency: A non-parametric analysis of Hong Kong's banking system. *Journal of Banking & Finance*, 30, 1443-1466.
- DU, K. & SIM, N. 2016. Mergers, acquisitions, and bank efficiency: Cross-country evidence from emerging markets. *Research in International Business and Finance*, 36, 499-510.
- DU, M. & BOATENG, A. 2015. State ownership, institutional effects and value creation in cross-border mergers & acquisitions by Chinese firms. *International Business Review*, 24, 430-442.
- DUNGEY, M., FRY, R., GONZÁLEZ-HERMOSILLO, B. & MARTIN, V. L. 2007. Contagion in global equity markets in 1998: The effects of the Russian and LTCM crises. *The North American Journal of Economics and Finance*, 18, 155-174.
- DUNN, J. K., INTINTOLI, V. J. & MCNUTT, J. J. 2015. An examination of non-government-assisted US commercial bank mergers during the financial crisis. *Journal of Economics and Business*, 77, 16-41.
- DZHAGITYAN, E. 2018. Perspectives of Macrofinance Regulation of Banking M&A in the Context of the International Reform of Banking Regulation.
- EBA, E. B. A. 2018. Report on prudential risks and opportunities arising for institutions from FinTech. Online: European Banking Authority.
- EBA, E. B. A. 2019. Impact of FinTech on payment institutions' and e-money institutions' business models. Online: European Banking Authority.
- ECB, E. C. B. 2018. Financial Stability Review. May 2018 ed. [http://www.ecb.europa.eu/pub/fsr/html/all\\_releases.en.html](http://www.ecb.europa.eu/pub/fsr/html/all_releases.en.html): ECB.
- EKKAYOKKAYA, M., HOLMES, P. & PAUDYAL, K. 2009. The Euro and the changing face of european banking: Evidence from mergers and acquisitions. *European financial management*, 15, 451-476.
- ELSAS, R., HACKETHAL, A. & HOLZHÄUSER, M. 2010. The anatomy of bank diversification. *Journal of Banking & Finance*, 34, 1274-1287.
- ELYASIANI, E., STAIKOURAS, S. K. & DONTIS-CHARITOS, P. 2012. Cross-industry product diversification and contagion in risk and return: The case of bank-insurance takeovers.
- ELYASIANI, E. & WANG, Y. 2012. Bank holding company diversification and production efficiency. *Applied Financial Economics*, 22, 1409-1428.
- ENGLE, R. 2009. *The Volatility Institute* [Online]. New York University Stern School of Business. Available: <https://vlab.stern.nyu.edu/analysis/RISK.WORLDFIN-MR.GMES?selectedDate=2017-06-16> [Accessed 18/05/2017 2017].
- ENGLE, R. & ZAZZARA, C. 2017. Systemic Risk in the Financial System: Capital Shortfalls under Brexit, the US elections, and the Italian Referendum. *S&P Global; Market Intelligence*. Online: S&P Global.
- ENGLE, R. F. 1990. Stock Volatility and the Crash of '87: Discussion. *The Review of Financial Studies*, 3, 103-106.

- ENGLE, R. F. & RUAN, T. 2018. How Much SRISK is Too Much?
- ENGLE, R. F. & VICTOR, N. K. 1993. Measuring and testing the impact of news on volatility. *The Journal of Finance*, 48, 1749-1778.
- EPSTEIN, G. & MONTECINO, J. A. 2015. Reforming the regulation of community banks after Dodd-Frank. *Ind. LJ*, 90, 179.
- EPSTEIN, R. A. 2014. When do foreign banks 'cut and run'? Evidence from west European bailouts and east European markets. *Review of International Political Economy*, 21, 847-877.
- FAHLENBRACH, R., PRILMEIER, R. & STULZ, R. M. 2012. This Time Is the Same: Using Bank Performance in 1998 to Explain Bank Performance during the Recent Financial Crisis. *The Journal of Finance*, 67, 2139-2185.
- FAMA, E. F. 1976. *Foundations of finance: portfolio decisions and securities prices*, Basic Books (AZ).
- FAMA, E. F., FISHER, L., JENSEN, M. C. & ROLL, R. 1969. The adjustment of stock prices to new information. *International economic review*, 10, 1-21.
- FÄRE, R., FØRSUND, F. R., GROSSKOPF, S., HAYES, K. & HESHMATI, A. 2001. A note on decomposing the Malmquist productivity index by means of subvector homotheticity. *Economic Theory*, 17, 239-245.
- FCA, F. C. A. 2017. *FCA finalises revised Payment Services Directive (PSD2) requirements* [Online]. Online: Financial Conduct Authority. Available: <https://www.fca.org.uk/news/press-releases/fca-finalises-revised-psd2-requirements> [Accessed 2018].
- FCIC, F. 2011. The Financial Crisis Inquiry Report: Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States 1er éd. *Public Affairs*.
- FENDER, I. & LEWRICK, U. 2015. Calibrating the leverage ratio. *BIS Quarterly Review*, 43-58.
- FERRELL, O. C. & FRAEDRICH, J. 2015. *Business ethics: Ethical decision making & cases*, Nelson Education.
- FIELDS, P. L., FRASER, D. R. & KOLARI, J. W. 2007. Is bancassurance a viable model for financial firms? *Journal of Risk and Insurance*, 74, 777-794.
- FIORDELISI, F. 2007. Shareholder value efficiency in European banking. *Journal of Banking & Finance*, 31, 2151-2171.
- FIORDELISI, F. & MARE, D. S. 2014. Competition and financial stability in European cooperative banks. *Journal of International Money and Finance*, 45, 1-16.
- FONSECA, A. R. & GONZÁLEZ, F. 2010. How bank capital buffers vary across countries: The influence of cost of deposits, market power and bank regulation. *Journal of Banking & Finance*, 34, 892-902.
- FRANKS, J., HARRIS, R. & TITMAN, S. 1991. The postmerger share-price performance of acquiring firms. *Journal of Financial Economics*, 29, 81-96.
- FRASER, D. R. & ZHANG, H. 2009. Mergers and Long-Term Corporate Performance: Evidence from Cross-Border Bank Acquisitions. *Journal of Money, Credit and Banking*, 41, 1503-1513.
- FURFINE, C. H. & ROSEN, R. J. 2011. Mergers increase default risk. *Journal of Corporate Finance*, 17, 832-849.
- GAI, P. & KAPADIA, S. 2010. Contagion in financial networks. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 466, 2401-2423.
- GAMBACORTA, L. & RIXTEL, A. 2013. Structural bank regulation initiatives: approaches and implications. Bank for International Settlements.

- GARMAISE, M. J. & MOSKOWITZ, T. J. 2006. Bank mergers and crime: The real and social effects of credit market competition. *the Journal of Finance*, 61, 495-538.
- GENNAIOLI, N., MARTIN, A. & ROSSI, S. 2018. Banks, government bonds, and default: What do the data say? *Journal of Monetary Economics*.
- GHOSH, A. 2001. Does operating performance really improve following corporate acquisitions? *Journal of Corporate Finance*, 7, 151-178.
- GIESECKE, K. & KIM, B. 2011. Systemic risk: What defaults are telling us. *Management Science*, 57, 1387-1405.
- GILBERT, R. A. & WILSON, P. W. 1998. Effects of deregulation on the productivity of Korean banks. *Journal of Economics and Business*, 50, 133-155.
- GODDARD, J., MCKILLOP, D. & WILSON, J. O. S. 2008. The diversification and financial performance of US credit unions. *Journal of Banking & Finance*, 32, 1836-1849.
- GODDARD, J., MOLYNEUX, P. & WILSON, J. 2012a. Banking in the European Union. In: BERGER, A. N., MOLYNEUX, P. & WILSON, J. O. S. (eds.) *Oxford Handbook of Banking*. Oxford.
- GODDARD, J., MOLYNEUX, P. & ZHOU, T. 2012b. Bank mergers and acquisitions in emerging markets: evidence from Asia and Latin America. *The European Journal of Finance*, 18, 419-438.
- GOETZ, M. 2012. Bank diversification, market structure and bank risk taking: Evidence from US commercial banks. Working Paper.
- GOETZ, M. R., LAEVEN, L. & LEVINE, R. 2016. Does the geographic expansion of banks reduce risk? *Journal of Financial Economics*, 120, 346-362.
- GRIFELL-TATJE, E. & LOVELL, C. K. 1996. Deregulation and productivity decline: The case of Spanish savings banks. *European Economic Review*, 40, 1281-1303.
- GROPP, R., HAKENES, H. & SCHNABEL, I. 2011. Competition, Risk-shifting, and Public Bail-out Policies. *The Review of Financial Studies*, 24, 2084-2120.
- HAGENDORFF, J., HERNANDO, I., NIETO, M. J. & WALL, L. D. 2012. What do premiums paid for bank M&As reflect? The case of the European Union. *Journal of Banking & Finance*, 36, 749-759.
- HAGENDORFF, J. & KEASEY, K. 2009. Post-merger strategy and performance: evidence from the US and European banking industries. *Accounting & Finance*, 49, 725-751.
- HALKOS, G. E. & TZEREMES, N. G. 2011. Modelling the effect of national culture on multinational banks' performance: A conditional robust nonparametric frontier analysis. *Economic Modelling*, 28, 515-525.
- HAMADA, R. S. 1972. The effect of the firm's capital structure on the systematic risk of common stocks. *The Journal of Finance*, 27, 435-452.
- HARDOUIN, P. 2009. Banks governance and public-private partnership in preventing and confronting organized crime, corruption and terrorism financing. *Journal of Financial Crime*, 16, 199-209.
- HAUSMAN, J. A. 1974. Full information instrumental variables estimation of simultaneous equations systems. *Annals of Economic and Social Measurement*, Volume 3, number 4. NBER.
- HAUSWALD, R. & MARQUEZ, R. 2006. Competition and Strategic Information Acquisition in Credit Markets. *The Review of Financial Studies*, 19, 967-1000.
- HEALY, P. M., PALEPU, K. G. & RUBACK, R. S. 1992. Does corporate performance improve after mergers? *Journal of Financial Economics*, 31, 135-175.

- HEATON, J. 1995. An Empirical Investigation of Asset Pricing with Temporally Dependent Preference Specifications. *Econometrica*, 63, 681-717.
- HEID, F. 2007. The cyclical effects of the Basel II capital requirements. *Journal of Banking & Finance*, 31, 3885-3900.
- HENDRICKSON, J. M. 2011. *Regulation and Instability in U.S. Commercial Banking, A History of Crises*, Hampshire, England, Palgrave Macmillan.
- HERNANDO, I., NIETO, M. J. & WALL, L. D. 2009. Determinants of domestic and cross-border bank acquisitions in the European Union. *Journal of Banking & Finance*, 33, 1022-1032.
- HERRING, R. & CARMASSI, J. 2010. The corporate structure of international financial conglomerates. In: BERGER, A. N., MOLYNEUX, P. & WILSON, J. O. S. (eds.) *The Oxford Handbook of Banking*. Oxford University Press. Oxford University: Oxford University Press.
- HERRING, R. J. & SANTOMERO, A. M. 1990. The corporate structure of financial conglomerates. *Journal of Financial Services Research*, 4, 471-497.
- HIGGINS, R. C. 1977. How much growth can a firm afford? *Financial Management*, 7-16.
- HILBE, J. M. 2011. Logistic Regression. In: LOVRIC, M. (ed.) *International Encyclopedia of Statistical Science*. Berlin, Heidelberg: Springer Berlin Heidelberg.
- HIRTLE, B. J. & STIROH, K. J. 2007. The return to retail and the performance of US banks. *Journal of Banking & Finance*, 31, 1101-1133.
- HOEING, T. 2018. Regulator warns bank reforms threaten financial stability In: JOPSON, B. & MCLANNAHAN, B. (eds.) *Tom Hoenig (FDIC Vice Chair) says relaxation of post-crisis constraints could undermine US economy*. Washington, USA: Financial Times.
- HOFFMAN, A. J. & VENTRESCA, M. J. 2002. *Organizations, policy and the natural environment: Institutional and strategic perspectives*, Stanford University Press.
- HOGGARTH, G., REIS, R. & SAPORTA, V. 2002. Costs of banking system instability: Some empirical evidence. *Journal of Banking & Finance*, 26, 825-855.
- HOOSE, D. V. 2010. *The industrial organisation of banking, bank behavior, market structure, and regulation*, London, New York, Springer Heidelberg Dordrecht.
- HOSKISSON, R. E., EDEN, L., LAU, C. M. & WRIGHT, M. 2000. Strategy in emerging economies. *Academy of management journal*, 43, 249-267.
- HOUSTON, J. F., JAMES, C. M. & RYNGAERT, M. D. 2001. Where do merger gains come from? Bank mergers from the perspective of insiders and outsiders. *Journal of Financial Economics*, 60, 285-331.
- HOUSTON, J. F., LIN, C. & MA, Y. 2012. Regulatory Arbitrage and International Bank Flows. *the Journal of Finance*, 67, 1845-1895.
- HOUSTON, J. F. & RYNGAERT, M. D. 1994. The overall gains from large bank mergers. *Journal of Banking & Finance*, 18, 1155-1176.
- HUGHES, J. P. & MESTER, L. J. 2014. Measuring the performance of banks, theory, practice, evidence, and some policy implications. In: WILSON, J. O. S., MOLYNEUX, P. & BERGER, A. N. (eds.) *Handbook of Banking*. Oxford University Press: Oxford University.
- HUGONNIER, J. & MORELLEC, E. 2017. Bank capital, liquid reserves, and insolvency risk. *Journal of Financial Economics*, 125, 266-285.

- HULJAK, I. 2015. Market power and stability of CEE banks. *Business systems research journal: international journal of the Society for Advancing Business & Information Technology (BIT)*, 6, 74-90.
- HUSSAIN, S., KHATTAK, J., RIZWAN, A. & LATIF, M. A. 2013. ANSOFF matrix, environment, and growth-an interactive triangle. *Management and Administrative Sciences Review*, 2, 196-206.
- IBRAGIMOV, R., JAFFEE, D. & WALDEN, J. 2011. Diversification disasters. *Journal of Financial Economics*, 99, 333-348.
- IJTSM, P., SPIERDIJK, L. & SHAFFER, S. 2017. The concentration–stability controversy in banking: New evidence from the EU-25. *Journal of Financial Stability*, 33, 273-284.
- IRRESBERGER, F., BIERTH, C. & WEIß, G. N. F. 2016. Size is everything: Explaining SIFI designations. *Review of Financial Economics*, 32, 7-19.
- ISIK, I. 2007. Bank ownership and productivity developments: evidence from Turkey. *Studies in Economics and Finance*, 24, 115-139.
- ISIK, I. & HASSAN, M. K. 2003. Financial deregulation and total factor productivity change: An empirical study of Turkish commercial banks. *Journal of Banking & Finance*, 27, 1455-1485.
- ITTNER, C. D., LARCKER, D. F. & RANDALL, T. 2003. Performance implications of strategic performance measurement in financial services firms. *Accounting, organizations and society*, 28, 715-741.
- J.P.MORGAN 2018. Global M&A Outlook; Navigating consolidation and disruption. Online: J.P.Morgan.
- J.S. RAMALHO, J. & DA SILVA, J. V. 2009. A two-part fractional regression model for the financial leverage decisions of micro, small, medium and large firms. *Quantitative Finance*, 9, 621-636.
- JIMÉNEZ, G., LOPEZ, J. A. & SAURINA, J. 2013. How does competition affect bank risk-taking? *Journal of Financial Stability*, 9, 185-195.
- JOHN, K., MAKHIJA, A. K. & FERRIS, S. P. 2014. *Corporate governance in the US and global settings; advances in financial economics*, Emerald Group Publishing.
- JOHNSON, N. J. 1978. Modified t tests and confidence intervals for asymmetrical populations. *Journal of the American Statistical Association*, 73, 536-544.
- JOKIPII, T. & MILNE, A. 2008. The cyclical behaviour of European bank capital buffers. *Journal of Banking & Finance*, 32, 1440-1451.
- JORGENSON, D. W. & LAFFONT, J.-J. 1974. Efficient estimation of nonlinear simultaneous equations with additive disturbances. *Annals of Economic and Social Measurement*, Volume 3, number 4. NBER.
- JOSH, L. 1995. Venture Capitalists and the Oversight of Private Firms. *the Journal of Finance*, 50, 301-318.
- KAHLE, K. M. & STULZ, R. M. 2013. Access to capital, investment, and the financial crisis. *Journal of Financial Economics*, 110, 280-299.
- KAN, K. & OHNO, T. 2012. Merger of major banks from the EVA standpoint. *Public Policy Review*, 8, 737-774.
- KANE, E. J. 1977. Good intentions and unintended evil: The case against selective credit allocation. *Journal of Money, Credit and Banking*, 9, 55-69.
- KANE, E. J. 1981a. Accelerating inflation, technological innovation, and the decreasing effectiveness of banking regulation. *Journal of Finance*, 36, 355-367.
- KANE, E. J. 1981b. Accelerating inflation, technological innovation, and the decreasing effectiveness of banking regulation. *the Journal of Finance*, 36.

- KANE, E. J. 2000. Incentives for banking megamergers: What motives might regulators infer from event-study evidence? *Journal of Money Credit and Banking*, 32, 671-701.
- KAROLYI, G. A. & TABOADA, A. G. 2015a. Regulatory Arbitrage and Cross-Border Bank Acquisitions. *The Journal of Finance*, 70, 2395-2450.
- KAROLYI, G. A. & TABOADA, A. G. 2015b. Regulatory arbitrage and cross-border bank acquisitions. *the Journal of Finance*, 70, 2395-2450.
- KASHYAP, A. K., TSOMOCOS, D. P. & VARDOULAKIS, A. 2017. Optimal Bank Regulation in the Presence of Credit and Run Risk. Board of Governors of the Federal Reserve System (US).
- KAUFMAN, G. G. 1992. Capital in banking: past, present and future. *Journal of Financial Services Research*, 5, 385-402.
- KAUFMAN, G. G. 2014. Too big to fail in banking: What does it mean? *Journal of Financial Stability*, 13, 214-223.
- KEELEY, M. C. 1990. Deposit insurance, risk, and market power in banking. *American Economic Review*, 80, 1183-1200.
- KEELEY, M. C. & FURLONG, F. T. 1990. A reexamination of mean-variance analysis of bank capital regulation. *Journal of Banking & Finance*, 14, 69-84.
- KELTON, A. S. & YANG, Y.-W. 2008. The impact of corporate governance on Internet financial reporting. *Journal of Accounting and Public Policy*, 27, 62-87.
- KETTENI, E. & KOTTARIDI, C. 2019. The impact of regulations on the FDI-growth nexus within the institution-based view: A nonlinear specification with varying coefficients. *International Business Review*, 28, 415-427.
- KEVORK, I. S., PANGE, J., TZEREMES, P. & TZEREMES, N. G. 2017. Estimating Malmquist productivity indexes using probabilistic directional distances: An application to the European banking sector. *European Journal of Operational Research*, 261, 1125-1140.
- KHAN, M. S., SCHEULE, H. & WU, E. 2017. Funding liquidity and bank risk taking. *Journal of Banking & Finance*, 82, 203-216.
- KINDELBERGER, C. & ALIBER, R. 2005. *Manias, Panics, and Crashes*, New Jersey, Wiley & Sons Inc.
- KIYMAZ, H. 2013. Cross-border mergers and acquisitions and country risk ratings: Evidence from U.S. Financials *The International Journal of Business and Finance Research*, 7, 17-29.
- KNAPP, M., GART, A. & CHAUDHRY, M. 2006. The impact of mean reversion of bank profitability on post-merger performance in the banking industry. *Journal of Banking & Finance*, 30, 3503-3517.
- KOEDIJK, K. G., KOOL, C. J. M., SCHOTMAN, P. C. & VAN DIJK, M. A. 2002. The cost of capital in international financial markets: local or global? *Journal of International Money and Finance*, 21, 905-929.
- KOETTER, M., BOS, J. W. B., HEID, F., KOLARI, J. W., KOOL, C. J. M. & PORATH, D. 2007. Accounting for distress in bank mergers. *Journal of Banking & Finance*, 31, 3200-3217.
- KONTOLAIMO, A., KOUNETAS, K., MOURTOS, I. & TSEKOURAS, K. 2012. Technology gaps in European banking: Put the blame on inputs or outputs? *Economic Modelling*, 29, 1798-1808.
- KOTHARI, S. & WARNER, J. B. 1997. Measuring long-horizon security price performance. *Journal of Financial Economics*, 43, 301-339.

- KOTHARI, S. & WARNER, J. B. 2007. Econometrics of event studies. Handbook of corporate finance: Empirical corporate finance. Elsevier/North-Holland.
- KOVACEVIC, R. M. & PFLUG, G. C. 2015. Measuring systemic risk: structural approaches. *Quantitative Financial Risk Management: Theory and Practice*, 1-21.
- KREIS, Y. & LEISEN, D. P. J. 2018. Systemic risk in a structural model of bank default linkages. *Journal of Financial Stability*, 39, 221-236.
- KREMERS, J. J., SCHOENMAKER, D. & WIERTS, P. J. 2003. Cross-sector supervision: which model? *Brookings-Wharton Papers on Financial Services*, 2003, 225-243.
- KWAN, S. H. & LADERMAN, E. S. 1999. On the portfolio effects of financial convergence-A review of the literature. *Economic Review*, 2, 18-31.
- LAEVEN, L. & FABIÁN, V. 2012. Systemic Banking Crises: An Update. *IMF Working Paper* Washington: International Monetary Fund.
- LAEVEN, L. & LEVINE, R. 2007. Is there a diversification discount in financial conglomerates? *Journal of Financial Economics*, 85, 331-367.
- LAEVEN, L. & LEVINE, R. 2009. Bank governance, regulation and risk taking. *Journal of Financial Economics*, 93, 259-275.
- LAEVEN, L., RATNOVSKI, L. & TONG, H. 2016. Bank size, capital, and systemic risk: Some international evidence. *Journal of Banking & Finance*, 69, S25-S34.
- LAI, C. & LI, M. C. 2015. Governing the global economy with the one-size-fits-all Model: From ideology to reality. *Research in World Economy*, 6, 1-13.
- LEIGHTNER, J. E. & LOVELL, C. K. 1998. The impact of financial liberalization on the performance of Thai banks. *Journal of Economics and Business*, 50, 115-131.
- LEITNER, K.-H. & GÜLDENBERG, S. 2010. Generic strategies and firm performance in SMEs: a longitudinal study of Austrian SMEs. *Small Business Economics*, 35, 169-189.
- LEPETIT, L., PATRY, S. & ROUS, P. 2004. Diversification versus specialization: an event study of M&As in the European banking industry. *Applied Financial Economics*, 14, 663-669.
- LERSKULLAWAT, A. 2017. Effects of banking sector and capital market development on the bank lending channel of monetary policy: An ASEAN country case study. *Kasetsart Journal of Social Sciences*, 38, 9-17.
- LEVINE, R. 1997. Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature*, 35, 688-726.
- LEVINE, R. 2005. Finance and growth: theory and evidence. *Handbook of economic growth*, 1, 865-934.
- LIIKANEN, E., BÄNZIGER, H., CAMPA, J. M., GALLOIS, L., GOYENS, M., KRAHNEN, J. P., MAZZUCHELLI, M., SERGEANT, C., TUMA, Z., VANHEVEL, J. & WIJFFELS, H. 2012. High-level Expert Group on reforming the structure of the EU banking sector. In: LIIKANEN, E. (ed.). Brussels, 2 October 2012: High-level Expert Group on reforming the structure of the EU banking sector
- LINDER, J. C. & CRANE, D. B. 1993. Bank Mergers: Integration and Profitability. *Journal of Financial Services Research*, 7, 35-55.

- LINDQUIST, K.-G. 2004. Banks' buffer capital: how important is risk. *Journal of International Money and Finance*, 23, 493-513.
- MACKINLAY, A. C. 1997. Event Studies in Economics and Finance. *Journal of Economic Literature*, 35, 13-39.
- MALMQUIST, S. 1953. Index numbers and indifference surfaces. *Trabajos de Estadística y de Investigación Operativa*, 4, 209-242.
- MANDELKER, G. N. & RHEE, S. G. 1984. The Impact of the Degrees of Operating and Financial Leverage on Systematic Risk of Common Stock. *Journal of Financial and Quantitative Analysis*, 19, 45-57.
- MARCUS, A. J. 1984. Deregulation and bank financial policy. *Journal of Banking & Finance*, 8, 557-565.
- MARQUEZ, R. 2002. Competition, Adverse Selection, and Information Dispersion in the Banking Industry. *The Review of Financial Studies*, 15, 901-926.
- MARTIN, R., PIKE, A., TYLER, P. & GARDINER, B. 2016. Spatially rebalancing the UK economy: Towards a new policy model? *Regional Studies*, 50, 342-357.
- MARTOVOY, A. & MENTION, A.-L. 2016. Patterns of new service development processes in banking. *International Journal of Bank Marketing*, 34, 62-77.
- MARTYNOVA, M. & RENNEBOOG, L. 2008. A century of corporate takeovers: What have we learned and where do we stand? *Journal of Banking & Finance*, 32, 2148-2177.
- MELVIN, M. & TAYLOR, M. P. 2009. The global financial crisis: Causes, threats and opportunities. Introduction and overview. *Journal of International Money and Finance*, 28, 1243-1245.
- MERROUCHE, O. & NIER, E. 2017. Capital inflows, monetary policy, and financial imbalances. *Journal of International Money and Finance*, 77, 117-142.
- MERROUCHE, O. & NIER, E. W. 2014. The Global Financial Crisis What Drove the Build-Up?
- MESLIER, C., MORGAN, D. P., SAMOLYK, K. & TARAZI, A. 2016. The benefits and costs of geographic diversification in banking. *Journal of International Money and Finance*, 69, 287-317.
- MICU, A. & MICU, I. 2016. Mergers And Acquisitions In The Banking Sector During The Financial Crisis. *SEA-Practical Application of Science*, 385-392.
- MILLER, T., KIM, A. B. & HOLMES, K. 2000-2017. 2015 Index of economic Freedom. *Washington DC: The Heritage Foundation*.
- MISHKIN, F. S. 1999. Financial consolidation: Dangers and opportunities. *Journal of Banking and Finance*, 23, 675-691.
- MODY, A. & SANDRI, D. 2014. The eurozone crisis: how banks and sovereigns came to be joined at the hip. *Economic Policy*, 27, 199-230.
- MOLYNEUX, P., SCHAECK, K. & ZHOU, T. M. 2014. 'Too systemically important to fail' in banking – Evidence from bank mergers and acquisitions. *Journal of International Money and Finance*, 49, 258-282.
- MORCK, R., SHLEIFER, A. & VISHNY, R. W. 1990. Do managerial objectives drive bad acquisitions? *the Journal of Finance*, 45, 31-48.
- MORCK, R. K., STANGELAND, D. A. & YEUNG, B. 1998. Inherited wealth, corporate control and economic growth: The Canadian disease. National Bureau of Economic Research.
- MOSHIRIAN, F. 2011. The global financial crisis and the evolution of markets, institutions and regulation. *Journal of Banking & Finance*, 35, 502-511.

- MOSHIRIAN, F. 2012. The future and dynamics of global systemically important banks. *Journal of Banking & Finance*, 36, 2675-2679.
- MOUSSETIS, R. 2011. Ansoff revisited: How Ansoff interfaces with both the planning and learning schools of thought in strategy. *Journal of Management History*, 17, 102-125.
- NEALE, F. R., DRAKE, P. P. & CLARK, S. P. 2010. Diversification in the financial services industry: The Effect of the Financial Modernization Act. *The BE Journal of Economic Analysis & Policy*, 10.
- NIER, E., YANG, J., YORULMAZER, T. & ALENTORN, A. 2007. Network models and financial stability. *Journal of Economic Dynamics and Control*, 31, 2033-2060.
- NISAR, S., PENG, K., WANG, S. & ASHRAF, B. N. 2018. The Impact of Revenue Diversification on Bank Profitability and Stability: Empirical Evidence from South Asian Countries. *International Journal of Financial Studies*, 6, 40.
- OLSON, G. T. & PAGANO, M. S. 2005. A New Application of Sustainable Growth: A Multi-Dimensional Framework for Evaluating the Long Run Performance of Bank Mergers. *Journal of Business Finance & Accounting*, 32, 1995-2036.
- OWUSU KWATENG, K. 2019. Examining the efficiency of IT applications and bank performance. *Industrial Management & Data Systems*, 119, 2072-2090.
- PAPADIA, F. 2018. *The effects of Brexit on UK growth and inflation*. [Online]. London: London School of Economics and Political Sciences. Available: <http://eprints.lse.ac.uk/90821/> [Accessed 2019].
- PARLIAMENT, U. 2013. Financial Services (Banking Reform) Act. Accessed via [http://www.legislation.gov.uk/ukpga/2013/33/pdfs/ukpga\\_20130033\\_en.pdf](http://www.legislation.gov.uk/ukpga/2013/33/pdfs/ukpga_20130033_en.pdf).
- PARSONS, C. & MUTENGA, S. 2009. Impact of the banking crisis on insurance markets. *The Banking Crisis Handbook*, London: Chapman–Hall.
- PASIOURAS, F. 2008a. Estimating the technical and scale efficiency of Greek commercial banks: the impact of credit risk, off-balance sheet activities, and international operations. *Research in International Business and Finance*, 22, 301-318.
- PASIOURAS, F. 2008b. International evidence on the impact of regulations and supervision on banks technical efficiency: an application of two-stage data envelopment analysis. 30, 187 - 223.
- PASIOURAS, F. 2008c. International evidence on the impact of regulations and supervision on banks' technical efficiency: an application of two-stage data envelopment analysis. *Review of Quantitative Finance and Accounting*, 30, 187-223.
- PASTOR, J. & LOVELL, K. 2007. Circularity of the Malmquist productivity index. *Economic Theory*, 33, 591–599.
- PENG, M. W., SUN, S. L., PINKHAM, B. & CHEN, H. 2009. The institution-based view as a third leg for a strategy tripod. *Academy of Management Perspectives*, 23, 63-81.
- PENG, M. W., WANG, D. Y. L. & JIANG, Y. 2008. An institution-based view of international business strategy: a focus on emerging economies. *Journal of International Business Studies*, 39, 920-936.
- PETERSEN, H.-G. & WIEGELMANN, A. M. 2014. Financial Markets and the Global Debt Crisis: Toward a New Architecture for A More Reliable Financial Sector\*. *Norteamérica*, 9, 79-107.
- PILBEAM, K. & NAGLE, F. 2009. High-tech IPOs in the USA, UK and Europe after the dot-com bubble. *International Journal of Financial Services Management*, 4, 64-75.

- PILOFF, S. J. & SANTOMERO, A. M. 1998. The value effects of bank mergers and acquisitions. *In: EDS, Y. A. A. G. M. (ed.) Bank Mergers and Acquisitions*, . Boston: Kluwer Academic Publishers.
- PINTO, F. & SOBREIRA, R. 2010. Financial innovations, crises and regulation: some assessments. *Journal of Innovation Economics & Management*, 9-23.
- PLATT, H. D. & PLATT, M. B. 1995. Sustainable Growth Rate of Firms in Financial Distress. *Journal of Economics & Finance*, 19, 147.
- PLESHKO, L. P. & HEIENS, R. A. 2008. The contemporary product-market strategy grid and the link to market orientation and profitability. *Journal of Targeting, Measurement and Analysis for Marketing*, 16, 108-114.
- POWERS, T. L. & HAHN, W. 2004. Critical competitive methods, generic strategies, and firm performance. *International Journal of Bank Marketing*, 22, 43-64.
- RAMASWAMY, K. 1997. The Performance Impact Of Strategic Similarity In Horizontal Mergers: Evidence From The U.S. Banking Industry. *Academy of management journal*, 40, 697-715.
- RAMIREZ, C. D. 2009. Bank fragility, “money under the mattress”, and long-run growth: US evidence from the “perfect” Panic of 1893. *Journal of Banking & Finance*, 33, 2185-2198.
- RAO-NICHOLSON, R. & KHAN, Z. 2017. Standardization versus adaptation of global marketing strategies in emerging market cross-border acquisitions. *International Marketing Review*, 34, 138-158.
- REIDENBACH, R. E. & MOAK, D. L. 1986. Exploring retail bank performance and new product development: a profile of industry practices. *Journal of Product Innovation Management*, 3, 187-194.
- REINHART, C. 2008. Eight hundred years of financial folly.
- REINHART, C. M. & ROGOFF, K. S. 2014. Recovery from Financial Crises: Evidence from 100 Episodes. *American Economic Review*, 104, 50-55.
- REPULLO, R. 2004. Capital requirements, market power, and risk-taking in banking. *Journal of Financial Intermediation*, 13, 156-182.
- REZITIS, A. N. 2008. Efficiency and productivity effects of bank mergers: Evidence from the Greek banking industry. *Economic Modelling*, 25, 236-254.
- RHOADES, S. A. 1994. A summary of merger performance studies in banking, 1980-93, and an assessment of the operating performance and event study methodologies. *Fed. Res. Bull.*, 80, 589.
- RHOADES, S. A. 1996. Competition and bank mergers: Directions for analysis from available evidence. *Antitrust Bull.*, 41, 339.
- ROLL, R. 1986. The hubris hypothesis of corporate takeovers. *Journal of business*, 197-216.
- ROLL, R. 1993. The hubris hypothesis of corporate takeovers. *Advances in Behavioral Finance*, 437-458.
- ROMERO-ÁVILA, D. 2007. Finance and growth in the EU: New evidence from the harmonisation of the banking industry. *Journal of Banking & Finance*, 31, 1937-1954.
- ROSEN, S. 2018. *Bank Capital Regulation and Systemic Risk in the Presence of Endogenous Fire Sales*. The University of North Carolina at Chapel Hill.
- RUBINSTEIN, M. E. 1973. A mean-variance synthesis of corporate financial theory. *The Journal of Finance*, 28, 167-181.
- SÁEZ, L. & SHI, X. 2004. Liquidity Pools, Risk Sharing, and Financial Contagion. *Journal of Financial Services Research*, 25, 5-23.

- SANTOMERO, A. M. & TRESTER, J. J. 1998. Financial innovation and bank risk taking. *Journal of Economic Behavior & Organization*, 35, 25-37.
- SARBANES, P. Sarbanes-oxley act of 2002. The Public Company Accounting Reform and Investor Protection Act. Washington DC: US Congress, 2002.
- SAUNDERS, A., CORNETT, M. M. & MCGRAW, P. A. 2006. *Financial institutions management: A risk management approach*, McGraw-Hill/Irwin.
- SAUNDERS, A., STROCK, E. & TRAVLOS, N. G. 1990. Ownership Structure, Deregulation, and Bank Risk Taking. *The Journal of Finance*, 45, 643-654.
- SCHAECK, K. & CIHÁK, M. 2014. Competition, Efficiency, and Stability in Banking. *Financial Management*, 43, 215-241.
- SCHAECK, K., CIHAK, M. & WOLFE, S. 2009. Are Competitive Banking Systems More Stable? *Journal of Money, Credit and Banking*, 41, 711-734.
- SCHMID, M. M. & WALTER, I. 2009. Do financial conglomerates create or destroy economic value? *Journal of Financial Intermediation*, 18, 193-216.
- SCOTT, W. R. 2002. Organizations and the natural environment: Evolving models. *Organizations, policy, and the natural environment: Institutional and strategic perspectives*, 453-64.
- SCOTT, W. R. 2008. *Institutions and organizations: Ideas and interests*, Sage.
- SERVAES, H. 1996. The Value of Diversification During the Conglomerate Merger Wave. *the Journal of Finance*, 51, 1201-1225.
- SETH, A. 1990. Sources of value creation in acquisitions: An empirical investigation. *Strategic Management Journal*, 11, 431-446.
- SHEHZAD, C. T., DE HAAN, J. & SCHOLTENS, B. 2010. The impact of bank ownership concentration on impaired loans and capital adequacy. *Journal of Banking & Finance*, 34, 399-408.
- SHIN, H. S. 2009. Securitisation and Financial Stability\*. *The Economic Journal*, 119, 309-332.
- SHIRASU, Y. 2018. Long-term strategic effects of mergers and acquisitions in Asia-Pacific banks. *Finance Research Letters*, 24, 73-80.
- SIMAR, L. & WILSON, P. W. 2007. Estimation and inference in two-stage, semi-parametric models of production processes. *Journal of Econometrics*, 136, 31-64.
- SLATTERY, D. J. & NELLIS, J. G. 2005. Product development in UK retail banking: Developing a market-oriented approach in a rapidly changing regulatory environment. *International Journal of Bank Marketing*, 23, 90-106.
- SMETS, F. 2014. Financial stability and monetary policy: How closely interlinked? *International Journal of Central Banking*, 10, 263-300.
- SPONG, K. & SHOENHAIR, J. D. 1992. Performance of banks acquired on an interstate basis. *Federal Reserve Bank of Kansas City, Financial Industry Perspectives*, December.
- STERN, J. M., STEWART, G. B. & CHEW, D. H. 1995. The EVA<sup>®</sup> financial management system. *Journal of applied corporate finance*, 8, 32-46.
- STIROH, K. J. & RUMBLE, A. 2006. The dark side of diversification: The case of US financial holding companies. *Journal of Banking & Finance*, 30, 2131-2161.

- STOLZ, S. & WEDOW, M. 2011. Banks' regulatory capital buffer and the business cycle: Evidence for Germany. *Journal of Financial Stability*, 7, 98-110.
- SUTANTO, E. M. & SUDARSONO, D. 2018. Empirical Analysis Of Firm Resources In The Banking Industry In Indonesia: A Resource-Based View. *International Journal of Business & Society*, 19.
- TANNA, S., LUO, Y. & DE VITA, G. 2017. What is the net effect of financial liberalization on bank productivity? A decomposition analysis of bank total factor productivity growth. *Journal of Financial Stability*, 30, 67-78.
- TEMIN, P., JACKSON, A. & ÁLLAMOK, A. E. 1969. *The Jacksonian Economy*, Norton New York.
- TEMIN, P. & NORTON, W. 1976. *Did monetary forces cause the Great Depression?*, Norton New York.
- TIRTIROĞLU, D., DANIELS, K. N. & TIRTIROĞLU, E. 2005. Deregulation, intensity of competition, industry evolution, and the productivity growth of US commercial banks. *Journal of Money, Credit and Banking*, 339-360.
- TIRTIROĞLU, D., DANIELS, K. N. & TIRTIROĞLU, E. 1998. Total factor productivity growth and regulation in US commercial banking during 1946–1995: an empirical investigation. *Journal of Economics and Business*, 50, 171-189.
- TORRES, E. & ZEIDAN, R. 2016. The life-cycle of national development banks: The experience of Brazil's BNDES. *The Quarterly Review of Economics and Finance*, 62, 97-104.
- TRAVLOS, N. G. 1987. Corporate takeover bids, methods of payment, and bidding firms' stock returns. *the Journal of Finance*, 42, 943-963.
- TSAGKANOS, A. G. 2010. Detecting Mergers and Acquisitions Effects on Performance, Efficiency, and Productivity with a Bootstrap Mixed Logit Approach: Evidence from Greece. *Applied Economics Quarterly*, 56, 317-341.
- TURNER, A. 2009. *The Turner Review: A regulatory response to the global banking crisis*, Financial Services Authority London.
- UHDE, A. & HEIMESHOFF, U. 2009. Consolidation in banking and financial stability in Europe: Empirical evidence. *Journal of Banking & Finance*, 33, 1299-1311.
- VALLASCAS, F. & HAGENDORFF, J. 2011. The impact of European bank mergers on bidder default risk. *Journal of Banking & Finance*, 35, 902-915.
- VAROTTO, S. & ZHAO, L. 2018. Systemic risk and bank size. *Journal of International Money and Finance*, 82, 45-70.
- VENNET, R. V. 2002. Cost and profit efficiency of financial conglomerates and universal banks in Europe. *Journal of Money, Credit and Banking*, 34, 254-282.
- VICKERS REPORT, I. C. O. B. 2011. Vickers Report. London: Independent Commission on Banking - U.K. Government.
- VIVES, X. 2011. Competition policy in banking. *Oxford Review of Economic Policy*, 27, 479-497.
- WAGNER, W. 2008. The homogenization of the financial system and financial crises. *Journal of Financial Intermediation*, 17, 330–356.
- WAGNER, W. 2010. Diversification at financial institutions and systemic crises. *Journal of Financial Intermediation*, 19, 373-386.

- WALKER, S. 2014. *Treasuries surge is most volatile since 2013 on fed rate bets* [Online]. [www.bloomberg.com/news/2014-10-18/treasuries-surge-is-most-volatile-since-2013-on-fed-rate-bets.html](http://www.bloomberg.com/news/2014-10-18/treasuries-surge-is-most-volatile-since-2013-on-fed-rate-bets.html) [Accessed 18 October 2014].
- WEIß, G. N. F., NEUMANN, S. & BOSTANDZIC, D. 2014. Systemic risk and bank consolidation: International evidence. *Journal of Banking & Finance*, 40, 165-181.
- WEISS, G. N. F., NEUMANN, S. & BOSTANDZIC, D. 2014. Systemic risk and bank consolidation: International evidence. *Journal of Banking & Finance*, 40, 165-181.
- WESTERFIELD, R. B. 1933. The Banking Act of 1933. *The Journal of Political Economy*, 721-749.
- WILLIAMS, J. M. & LIAO, A. 2008. The search for value: Cross-border bank M&A in emerging markets. *Journal of Comparative Economic Studies*, 50, 274-296.
- WINTON, A., KOCHERLAKOTA, N., LEVINE, R. & MITUSCH, K. Don't Put All Your Eggs in One Basket? Diversification and Specialization. in Lending, Working Paper, University of Minnesota. 31 for Tables and Figures, 1999. Citeseer.
- WORTHINGTON, A. C. 1999a. Malmquist indices of productivity change in Australian financial services. *Journal of International Financial Markets, Institutions and Money*, 9, 303 - 320.
- WORTHINGTON, A. C. 1999b. Malmquist indices of productivity change in Australian financial services. *Journal of International Financial Markets, Institutions and Money*, 9, 303-320.
- YEAGER, T. J., YEAGER, F. C. & HARSHMAN, E. 2007. The Financial Services Modernization Act: Evolution or revolution? *Journal of Economics and Business*, 59, 313-339.
- YORDANOVA, Z. 2013. Innovative Business Bank Products. *Trakia Journal of Sciences*, 11, 5-13.
- ZAJAC, E. J. & SHORTELL, S. M. 1989. Changing generic strategies: Likelihood, direction, and performance implications. *Strategic Management Journal*, 10, 413-430.
- ZELLNER, A. & THEIL, H. 1992. Three-stage least squares: simultaneous estimation of simultaneous equations. *Henri Theil's Contributions to Economics and Econometrics*. Springer.
- ZOLLO, M. & SINGH, H. 2004. Deliberate learning in corporate acquisitions: post-acquisition strategies and integration capability in U.S. bank mergers. *Strategic Management Journal*, 25, 1233-1256.