

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

Factors influencing bank deposits

A thesis presented in partial fulfilment of the requirements for
the degree of
Doctor of Philosophy (PhD)
in
Banking

At Massey University, Palmerston North,
New Zealand



MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

Nikhil Srivastava

Supervisors:

Prof. David Tripe

Dr. Mui Kuen Yuen (Kuen)

2020

Abstract

This thesis comprises three essays that investigate the effects of human capital, financial markets, and the banking system development on bank deposits, deposit funding, retail, and time deposits proportions. The first two essays are country level studies, whereas the third is at bank level. The data related to first essay has been obtained from the World Bank and the World Health Organisation (WHO). For the second and third essays, bank level data is from Bankscope and macroeconomic variables data are from the World Bank.

The first essay investigates the effects of human capital development on bank deposits, employing 2SLS method in a cross-country setup. Human capital development includes the development of the healthcare system and education level. I use two dependent variables: deposits to GDP ratio and value of total deposits. Results show a positive relationship between human capital development and bank deposits. However, the impact of healthcare system on total deposits is higher than the bank deposits to GDP ratio, suggesting that an improvement in the healthcare system increases households' income and a proportion of that increased income goes into the banking system. The impact of education is higher in high financially included countries than in less financially included countries.

The second essay examines the effects of financial markets development on bank deposits, using instrumental variables methods. Empirical results suggest that investors in developed and developing economies use financial markets differently. In highly financially integrated economies, the financial markets and banking system complement each other, whereas in fragmented markets they compete.

The third essay explores the effects of competition on bank deposit funding and composition. Interest cost has been used to measure deposit competition and the Herfindahl-Hirschman Index (HHI3) at deposits and loans levels to measure market structure. The results show that increased deposit competition encourages banks to increase the proportion of less

costly funds, causing a reduction in deposit funding. In contrast, high interest rates attract retail depositors, especially for time deposits, thereby increasing the proportion of retail deposits. However, this finding varies according to the financial development level of the countries. Market concentration shows negative effects on bank deposit funding and composition.

Acknowledgement

My sincere gratitude goes to the people who made my Ph.D. journey fruitful and enjoyable, without their support and guidance, I could not have sailed it. I cannot begin to express my thanks to my main supervisor Professor David Tripe and my co-supervisor, Dr. Mui Kuen Yuen (Kuen) for their invaluable guidance and supports. Their guidance and patience through the learning process has been fundamental for the development of this work. This thesis would have not been realised successfully without their constant feedback and insightful comments.

I owe my deepest gratitude to Professor Iftekhar Hasan and Emeritus Professor Srikanta Chatterjee for invaluable support, guidance, and comments. I also wish to thank Dr. Oscar Lau, Dr. Daniel Voica, Dr. Syed Hasan, Professor Roukmani Gounder, Dr. Mamiza Haq, Professor Martin Berka, Professor Martin Young, Associate Professor Ivan Diaz-Rainey, Dr. Tram Vu, and Associate Professor Martin Lubberink for their time to carry out fruitful discussion for the thesis and suggestions. A special thanks to Aditya, Joel and Saba for their invaluable comments on my writing. To my other colleagues Andrés, Maulik, Chanjief, Emily, Waheed, Hina, Odmaa, Salah, Mai, Trang, Dee, and other lab mates' thanks for your time and willingness to share ideas and views. I would also like to thanks to the Sri Lankan community based in Palmerston North for their support and encouragement.

Acknowledgements are extended to my mentors for life Surendra Kumar, Pramod Srivastava, Rishi Mehra, Pankaj Srivastava, and Late Gorakhnath Srivastava. I want to thank my friends Jayesh, Rijesh, Vaibhav, Shahina, Ajit, Vinu, Ashish, Brijesh, Jaya, Pooja, Nirosha, and Anand without their support, this dream could have not been achieved.

Last but not the least, I dedicate my dissertation work to my family. A special feeling of gratitude to my loving parents, Kripa Shankar Srivastava and Rita Srivastava and to my grandmothers Late Godavari Devi and Late Kesari Devi whose words of encouragement and

push for tenacity ring in my ears. My brothers and sisters Vishal, Akhil, Rohan, Poonam, Shipra, Anubhuti, and Aditi have never left my side and are very special.

Thesis related research outcomes

- Srivastava, N., Tripe, D., and Yuen, M.K. (2020) “Effects of competition on bank deposit funding: a cross-country analysis” 24th Annual (2020) New Zealand Finance Colloquium, Feb 13-14, 2020, Auckland University of Technology, New Zealand
- Srivastava, N., Tripe, D., and Yuen, M.K. (2019) “Effects of financial market development on bank deposit: a cross-country analysis” India Finance Conference (2019) Indian Institute of Management, Ahmedabad, December 19-21, 2019, India
- Srivastava, N., Tripe, D., and Yuen, M.K. (2019) “Effects of human capital development on bank deposits” 2019 Research Symposium on Finance and Economics (RSFE 2019), December 12-13, 2019, IFMR Graduate School of Business (Krea University), Sri City, Chennai, India
- Srivastava, N., Tripe, D., and Yuen, M.K. (2019) “Effects of human capital development on bank deposits” Annual Conference of the New Zealand Association of Economists, Victoria University of Wellington, July 3-5, 2019, Wellington
- Srivastava, N., Tripe, D., and Lau, O. (2019) “Effects of competition on the bank deposit mix: a cross-country analysis” The INFINITI Conference on International Finance, June 9-11, 2019, University of Glasgow, UK
- Srivastava, N., Tripe, D., and Lau, O. (2019) “Effects of competition on the bank deposit mix: a cross-country analysis” 9th International Conference of the Financial Engineering and Banking Society, May 30- June 1, 2019, Prague
- Srivastava, N., Tripe, D., and Lau, O. (2018) “Effects of financial market development on bank deposit mix: a cross-country analysis” The 2nd INFINITI Conference on International Finance ASIA-PACIFIC, December 10-11, 2018, University of Sydney, Australia
- “Effects of competition on bank deposits: a cross-country analysis” and “Effects of human capital development on bank deposits” have been presented in house seminars.

Accepted

- Srivastava, N., Tripe, D., and Yuen, M.K. (2020) “Effects of competition on bank deposits: a cross-country analysis” European Financial Management Association (EFMA), June 24-27, 2020, Dublin, Ireland.
- Srivastava, N., Tripe, D., and Yuen, M.K. (2020) “Effects of financial market development on bank deposit: worldwide evidence” 37th International Conference of the French Finance Association (AFFI), May 25-27, 2020, Audencia Business School, Nantes, France
- Srivastava, N., Tripe, D., and Yuen, M.K. (2020) “Effects of competition on bank deposits: a cross-country analysis” Financial Management Association (FMA), Europe, June 10-12, 2020, Limassol, Cyprus.
- Srivastava, N., Tripe, D., and Yuen, M.K. (2020) “Effects of competition on bank deposit funding: a cross-country analysis” Financial Market Corporate Governance Conference, April 15-17, 2020, La Trobe University, Australia.

Table of content

Abstract.....	ii
Acknowledgement	iv
Table of content	vii
List of tables.....	ix
List of figures.....	x
List of abbreviations	xi
1. Introduction.....	1
1.1. A historical and current perspective on the role of bank deposits for the liquidity management in the banking system	3
1.2. Overview of the thesis and contribution	10
1.3. Outline of the thesis.....	16
2. Effects of human capital development on bank deposits.....	17
2.1. Introduction	17
2.2. Existing literature	21
2.2.1 Research objective	24
2.3. Data collection and methodology.....	25
2.3.1 Methodology	28
2.4. Preliminary analysis	30
2.5. Discussion and analysis.....	32
2.5.1 Economic development.....	38
2.5.2 Bank based economy and market-based economy	43
2.5.3 Financial inclusion	44
2.6. Robustness.....	45
2.7. Conclusion.....	46
3. Effects of financial markets development on bank deposits.....	50
3.1. Introduction	50
3.2. Prior literature on financial architecture.....	53
3.2.1 Research objective	57
3.3. Data collection and methodology.....	57
3.3.1 Methodology	61
3.4. Preliminary analysis	63
3.5. Empirical findings and policy implications	65
3.5.1 Relationship between financial market development and bank deposits: based on economic development level of countries.....	72

3.5.2	Relationship between financial market development and bank deposits: based on financial development level of the countries	77
3.5.3	Crisis effects.....	81
3.5.4	Deposit insurance.....	82
3.6.	Robustness tests.....	83
3.7.	Conclusion.....	85
4.	Effects of competition on bank deposits	89
4.1.	Introduction	89
4.2.	Literature review	93
4.2.1	Prior research on deposits	93
4.2.2	Market power	95
4.2.3	Research questions.....	96
4.3.	Data collection.....	97
4.3.1	Control variables.....	98
4.3.2	Econometric methodology	99
4.4.	Preliminary analysis	106
4.5.	Main findings	110
4.5.1	Financial development level of the country	116
4.6.	Robustness tests.....	125
4.6.1	Additional Analysis	128
4.7.	Conclusion and policy implications	129
5.	Conclusions.....	132
5.1.	Contributions of the thesis.....	135
5.2.	Limitations and recommendations for future research.....	137
5.3.	Summary	138
References.....		140
Appendix 1	List of countries	156
Appendix 2	Human capital development: bank deposits (panel fixed effects method).....	158
Appendix 3	Human capital development: bank deposits (first difference method).....	159
Appendix 4	Human capital development: bank deposits (bank-based economies-2SLS).....	160
Appendix 5	Human capital development: bank deposits (market-based economies-2SLS).....	161
Appendix 6	Correlation matrix of full dataset.....	162
Appendix 7	List of countries	163

Appendix 8	Financial markets development: deposit funding and composition for all countries (panel fixed effects method).....	166
Appendix 9	Financial markets development: deposit funding and composition (crisis effect for all countries- 2SLS).....	167
Appendix 10	Financial markets development: deposit funding and composition (crisis effect for high financially developed countries- 2SLS).....	168
Appendix 11	Financial markets development: deposit funding and composition (crisis effect for less financially developed countries- 2SLS).....	169
Appendix 12	Financial markets development: deposit funding and composition (deposit insurance for all countries- 2SLS)	170
Appendix 13	Financial markets development: deposit funding and composition (deposit insurance in highly financially developed countries- 2SLS).....	171
Appendix 14	Financial markets development: deposit funding and composition (deposit insurance in less financially developed countries- 2SLS)	172
Appendix 15	Correlation matrix of full dataset.....	173
Appendix 16	List of countries and number of banks according to financial development level.....	174
Appendix 17	Bank deposit competition and banking market structure: bank deposit funding and composition (all countries)	176
Appendix 18	Bank deposit competition and banking market structure: bank deposit funding and composition (interest on retail deposits- highly financially developed economies).....	177
Appendix 19	Bank deposit competition and banking market structure: bank deposit funding and composition (interest on retail deposits- less financially developed economies).....	178
Appendix 20	Interaction- High income countries, Interest cost, HHID, and HHIL	179
Appendix 21	Correlation matrix of full dataset.....	180

List of tables

Table 1	Variables' names, notations, and their expected signs	25
Table 2	Summary statistics	27
Table 3	Human capital (healthcare and education) development: bank deposits (2SLS)	33
Table 4	Human capital (healthcare and education) development: bank deposits (two-step difference GMM).....	36
Table 5	Human capital (healthcare and education) development: bank deposits (two-step system GMM)	37
Table 6	Human capital (healthcare and education) development: bank deposits (high income countries-2SLS)	39
Table 7	Human capital (healthcare and education) development: bank deposits (low and middle-income countries-2SLS)	40

Table 8 Summary statistics of regional and income level distribution of countries.....	59
Table 9 Summary statistics of variables	60
Table 10 Variables' names, notations, and their expected signs	60
Table 11 Financial markets development: deposit funding and composition for all countries-2SLS.....	66
Table 12 Financial markets development: deposit funding and composition for all countries-two-step system GMM.....	71
Table 13 Financial markets development: deposit funding and composition in high-income countries.....	74
Table 14 Financial markets development: deposit funding and composition in lower and upper-middle income countries.....	76
Table 15 Financial markets development: deposit funding and composition in highly financial developed countries	79
<i>Table 16 Financial markets development: deposit funding and composition in less financial developed countries</i>	<i>80</i>
Table 17 Income and regional distribution of countries	97
Table 18 Income and regional distribution of number of banks	97
Table 19 Literature survey	101
Table 20 Descriptive statistics	103
Table 21 Bank deposit competition and banking market structure: banking deposit funding and composition for all countries.....	108
Table 22 Bank deposit competition and banking market structure: banking deposit funding and composition for all countries.....	112
<i>Table 23 Bank deposit competition and banking market structure: Banking deposit funding and composition for high financially developed economies</i>	<i>118</i>
Table 24 Bank deposit competition and banking market structure: Banking deposit funding and composition for less financially developed economies.....	121

List of figures

Figure 1 Banks funding structure.....	2
Figure 2 Bank deposit funding (%) in the United States	6
Figure 3 Factors impacting bank deposits	13

List of abbreviations

2SLS	Two Stage Least Squares
ALM	Asset Liability Management
BASEL	International banking regulations set by the Basel Committee on Bank Supervision
BCBS	Basel Committee on Banking Supervision
CD	Certificate of Deposits
CDO	Collateralized Debt Obligation
CDS	Credit Default Swaps
CFPB	Consumer Financial Protection Bureau
COC	Control for Corruption
DF	Deposit Funding
DI	Deposit Insurance
EFI	Economic Freedom Index
FDI	Financial Development Index
FFI	Financial Freedom Index
FMA	Financial Market Access
FMD	Financial Market Depth
FME	Financial Market Efficiency
FMI	Financial Market Index
GDGDP	Government Expenditure to GDP (%)
GDP	Gross Domestic Products
GDPG	GDP Growth Rate
GE	Government Expenditure
GEFF	Government Effectiveness
GFC	Global Financial Crisis
GMM	Generalized Methods of Moment
HHI3	Herfindahl- Hirschman Index
HI	High-Income
HQLA	High-Quality Liquid Assets

IC	Interest Costs to Average Interest- Bearing Liabilities
LCR	Liquidity Coverage Ratio
MBS	Mortgage Backed Securities
MS	Market Size
NCDs	Negotiable Certificate of Deposits
NSFR	Net Stable Funding Ratio
OLS	Ordinary Least Squares
OMO	Open Market Operations
OOPUSD	Out of Pocket Health Expenditure
OP	Old Populations
PPCC	Public Private Compulsory Contribution to Healthcare
PPCCGDP	Public Private Compulsory Contribution to Healthcare to GDP (%)
PS	Political Stability
RDP	Retail Deposit Proportion
ROL	Rule of Law
RQ	Regulatory Quality
STA	Salary to Total Assets
TDP	Time Deposit Proportion
UK	United Kingdom
UNDP	United Nations Development Programme
USA	The United States
VIF	Variance Inflation Factor
VOICE	Voice and Accountability
WHO	The World Health Organisation

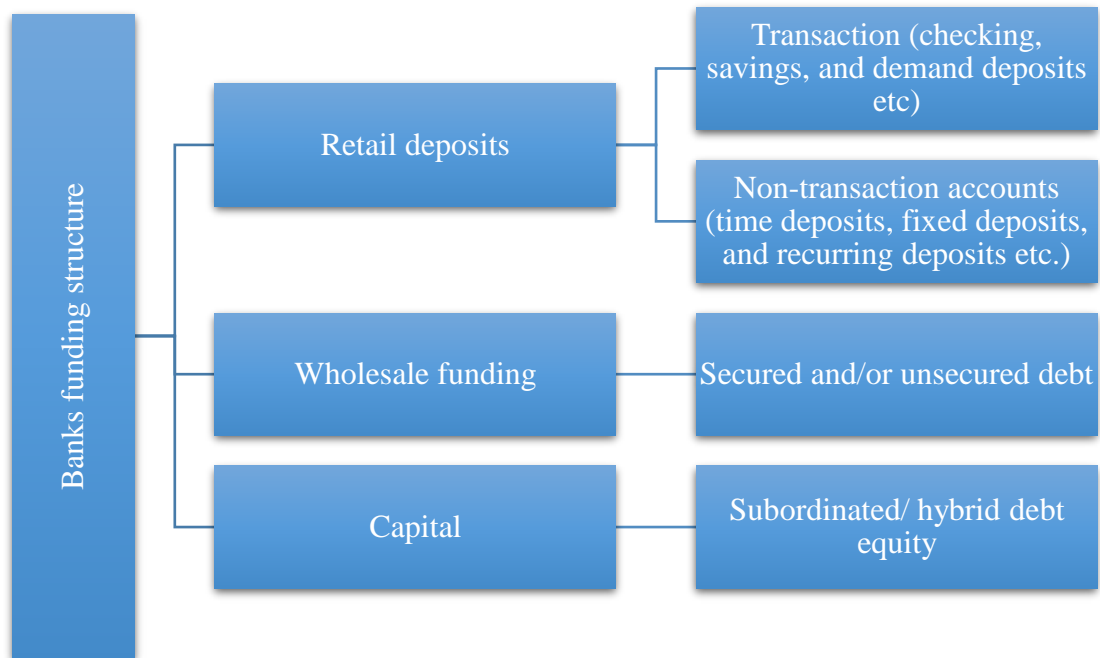
1. Introduction

A stable and resilient banking system is the backbone of the economy. It increases trust among stakeholders of the banking system by efficiently and effectively managing the flow of funds from lenders to borrowers. The stability of the banks mainly depends on managing lending activities and funding structure. Management of lending activities involves assessing and funding viable projects, whereas funding structure includes maintaining a balanced combination of equity capital, deposits, and wholesale funding (Sinkey, 1992). The discussion of lending activities is out of the scope of this thesis, which is limited to discussion of bank funding composition, particularly through bank deposits.

A higher proportion of retail deposits in banks' funding makes the banking system more resilient (Huang & Ratnovski, 2009). Banks generally have a mix of retail deposits and non-deposit funding. After the deregulation of interest rates and development of other financial products, deposit products became costly for banks (Hubbard, 2007). Therefore, their focus shifted to wholesale funding. The relaxation in liquidity constraints and highly liquid wholesale markets enabled an acceleration of banks' lending activities. They lent money for longer terms and funded this from short-term sources, believing that they could get funds from wholesale markets whenever they needed them. However, wholesale funding is sensitive to interest rates and noise (rumours) which makes the banking system fragile (Demirgüç-Kunt & Huizinga, 2010; Huang & Ratnovski, 2011). In 2007, as the real estate market started showing turbulence, investors in wholesale markets started withdrawing funds, leading to a liquidity crunch in wholesale markets (Dagher & Kazimov, 2015; Huang & Ratnovski, 2011). The high level of wholesale funding created liquidity risk, which was one of the primary factors behind the global financial crisis (GFC) between 2007 and 2009 (Demirgüç-Kunt & Huizinga, 2010; King,

2013). To mitigate the effects of a liquidity crisis, authorities across the globe took several steps, including deposit guarantees and bailout packages¹.

Figure 1 Banks funding structure



Source: IMF working paper Bank Debt in Europe: “Are Funding Models Broken” by Le Lesle (2012).

The GFC has returned the focus of the banking industry to its core business, accepting deposits and lending to entrepreneurs and/or borrowers (Berger & Bouwman, 2013). The regulators have highlighted the importance of retail deposits for the stability of the banking system in Basel-III (BCBS, 2010a). This creates a need to identify the factors that attract/affects bank deposits such as deposit rates and bank stability (Craig & Dinger, 2013; Mondschean & Opiela, 1999), service quality (Egan, Hortaçsu, & Matvos, 2017), accessibility of banks (Célerier & Matray, 2019). Apart from banking factors, other socioeconomic factors such as education, health, income, and financial markets also affect bank deposits (Evans,

¹ The US government formed the Troubled Asset Relief Program (TARP) to purchase the equity and warrants in distressed banks. Federal reserve made an emergency action plan for liquidity infusion in the financial system (Harbert, 2019).

Green, & Murinde, 2002; Shih, Chang, & Lin, 2010). In banking literature, bank deposits have been used as explanatory variables such as for bank stability (Khan, Scheule, & Wu, 2017; Vazquez & Federico, 2015), cost efficiency (Tortosa-Ausina, 2002), and profitability (Akhavain, Berger, & Humphrey, 1997; Maudos, Pastor, Pérez, & Quesada, 2002), although literature studying the determinants of bank deposits are relatively scarce. I have identified three factors, two at the country level and one at the firm level, which affect bank deposits i.e. human capital, financial markets development, and deposit competition within the banking system. This thesis aims to investigate the impact of human capital and financial market development on bank deposits, deposit funding², and its composition³. It also investigates how competition within the banking system influences bank deposit funding and composition.

1.1. A historical and current perspective on the role of bank deposits for the liquidity management in the banking system

During 1940s and 1950s, the high economic activity in the western world increased the flow of funds to the banking system. Thus, banks had ample transaction and non-transaction deposits⁴ that they deployed into different projects (Seltzer, 1940). These projects were assessed on the grounds of national interest and profitability by the government authorities in the United States (Sinkey, 1992). However, during 1960s, due to tax cuts and increased economic activities in the country, banks started facing shortage of funds (Canto, Joines, & Laffer, 1981). Problems were exacerbated by the restrictions on bank activities under the Federal Reserve regulations which ended up promoting the development of Eurocurrency markets (McKinnon, 1977; Schenk, 1998).

² Deposit funding includes deposit and short-term funding to total assets ratio.

³ Deposit composition includes the retail and time deposit proportions. Retail deposit proportion consists customer deposits to total deposits and short-term funding ratio and time deposit proportion consists customer time deposit to total customer deposits.

⁴ The total deposit to total assets was around 90 percent during 1940-50s (see Figure 2).

Similarly, in United Kingdom, the increase in economic activities incentivized the government to abolish the long-standing Capital Issues Committee and other official control measures on raising funds during 1970s (Goodhart, Hofmann, & Segoviano, 2004; Kaminsky & Schmukler, 2008; Reid, 1982). This allowed non-banking financial companies and industrialists to obtain funds through open market. This also increased the activities of banks⁵ outside the purview of the Bank of England and foreign banks during 1960s and contributed to the emergence of the Euromarkets (Schooner & Taylor, 1998). The surplus holders and savers, then, had a range of options from wholesale market funds to Eurobond to invest their fund with new borrowers for a better yield than in traditional deposit products, which created shortage of funds in the United Kingdom banking system (Goldberg & Saunders, 1980; Reid, 1982; Schenk, 1998; Schooner & Taylor, 1998). Such shortages of funds motivated banks to undertake liability management.

Citibank, then First National Bank of New York, started issuing negotiable certificate of deposits (NCDs), federal funds, and commercial paper to finance the loan demand in 1961 in the United States banking system (OCC, n.d.). Similarly, the use of wholesale market, special deposits, and liquidity requirement relaxations allowed United Kingdom banks to finance their lending demand (Davies, Richardson, Katinaite, & Manning, 2010; Reid, 1982). This started the era of wholesale banking and asset-liabilities management (ALM) in the banking system (Sinkey, 1992; Theilman, 1970). One of the main aims of ALM in the banking system was to increase profitability, which could be achieved by balance-sheet growth through credit expansion and increasing the bid-ask spread by decreasing the cost of funding and lending at higher interest rates (Sinkey, 1992). Hence, banks increased the proportion of

⁵ The banks which were outside the purview of the Bank of England were known as secondary banks.

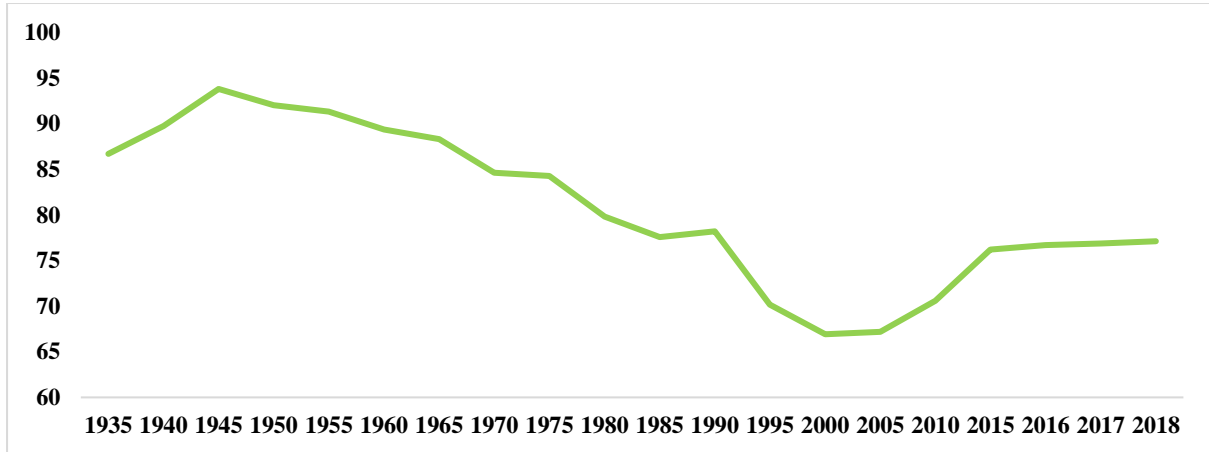
wholesale funding and lent more to increase their balance sheets. This was supported by the deregulation of the banking system in 1970s.

The deregulation of interest rate ceilings and bank branching during 1970s increased competition in the banking system. Depositors became rate sensitive and started looking for high yield investment products, which increased the use of borrowed funds in the banking system. As shown in Figure 2, in the United States, the deposit to total assets was 92 percent in 1950 but went down to 65 percent in 2007. In the aftermath of Russian Debt Crisis (1998) and Asian Financial Crisis (1997-98), the United States became an attractive destination for foreign investment. Innovative financial products such as mortgage backed securities (MBS), credit default swaps (CDS), and collateralized debt obligations (CDO) allowed foreign investors to invest in the United States real estate market (Bernanke, 2005; Krugman, 2009). The foreign flow of funds (Du & Rouse, 2018), low policy rates (Cukierman, 2013), off balance activities (Karim, Liadze, Barrell, & Davis, 2013), and intense bank competition increased banks' lending activities in the United States (Berger, Klapper, & Turk-Ariss, 2009; Le Lesle, 2012). To fund this high lending demand, banks relied on wholesale markets. The high liquidity and cost effectiveness made the wholesale market popular among banks. As a result, the proportion of wholesale funding increased to 18.4 percent in year 2008, compared with around 5 percent during 1970s (Koch, MacDonald, Edwards, & Duran, 2014). The similar trend was observed in the European banks, where loan to deposit ratio (LDR) went up to 140 percent in 2006 and banks used wholesale funding to fill this funding gap⁶ (Le Lesle, 2012). The proportion of wholesale funding also varies according to the size of the banks. In 2007, the ten largest banks of the United States had almost 47 percent of managed liabilities

⁶ Funding gap is the difference between customer loan and customer deposits (Le Lesle, 2012).

(wholesale funding) as source of funds, compared to 23 percent wholesale funding used by banks ranked less than 1000 (Koch et al., 2014).

Figure 2 Bank deposit funding (%) in the United States⁷



The liquid wholesale market made banks believe that they could get funds as and when they need. Hence, required reserves became less important for banks. During 1950s, the British banks used to maintain 30 percent liquid assets (treasury bills and short-dated securities) of their total assets. By the time of the GFC, according to Goodhart (2008), banks were carrying 0.5 percent cash assets and around 1 percent of traditional liquid assets in total liabilities⁸. Gray (2011) conducted a survey of the central banks and found that around 80 percent of central banks had substantially weakened their reserve requirements. This boosted economic activity and lending demand, which further created bubbles in the market (Cabral, 2013).

The problems were intensified by the extensive flow of foreign funds into the United States banking system, after the Asian (1997-98) and Russian financial crisis (1998). Foreign funds assisted in decreasing the policy rate, which increased the lending activity of banks. To fund the lending demand, the United States banks have utilised new financial products such as mortgage backed securities (MBS) and collateralized debt obligations (CDOs) (Bernanke,

⁷ Bank deposit funding= Total deposit / Total Assets*100

⁸ A few countries' central banks still maintain high liquid reserve ratios, which are mainly used for monetary policy and macro prudential policy. India still maintain 19.5 percent statutory liquidity ratio in the form of government securities, bonds and precious metals and 4 percent as cash reserve ratio (CRR) in the form of cash.

2005; Krugman, 2009). These products allow banks to sell their mortgage loans to investment company such as Ginnie Mae, Fannie Mae, and Freddie Mac. Thereafter, these loans were structured and rated⁹ according to their risk characteristics (known as MBS and CDO) that eventually sold to the broader financial markets. This allowed banks to increase their lending activities by putting these loans in off-balance sheet categories and managing their regulatory capital requirements (Acharya & Richardson, 2009). Although the objective of such structured products was to pass on the default risks to large investors, the commercial banks started investing in these products¹⁰ for regulatory management (Acharya, Schnabl, & Suarez, 2013). Thus, the risk was transferring from one bank to another, that created a systemic risk.

The high usage of wholesale funding (Huang & Ratnovski, 2011), obsolete reserve requirements (Cabral, 2013), poor quality loans (Ghosh, 2015), and high off-balance sheet activities (Karim et al., 2013) contributed to a liquidity crunch in the market (Brunnermeier, 2009). Foreign and other investors started withdrawing funds from wholesale markets. The banks started finding difficulties in rolling over their short-term liabilities in wholesale markets (Brunnermeier, 2009; Huang & Ratnovski, 2011). Major banks such as Lehman Brothers, Bear Stearns, IndyMac, Northern Rock, and Washington Mutual failed due to this liquidity crunch causing a systemic crisis (Kotz, 2009), which is known as the global financial crisis (GFC) 2007-09. In 2009, major countries such as Germany, United Kingdom, Japan, Eurozone, and Mexico among others showed decline in their GDP. Moreover, some developing countries' GDP growth rate also declined during 2009 (Nier & Merrouche, 2010).

⁹ Although rating agencies, Moody' Investor Service, Standard & Poor's, and Fitch Ratings were involved in rating the securitized products viz. MBS and CDO, they had biased opinion that real estate market will go up. Hence, they provided high ratings even the quality of the products were poor (Crotty, 2009; He, Qian, & Strahan, 2011).

¹⁰ The demarcation between the activities of commercial banks and investment banks, which was implemented through Glass-Steagall Act, were abolished in 1999. This allowed commercial banks to invest in the structured products, MBS and CDO (Krugman, 2009).

This aftermath has attracted the attention of the regulators and policy makers to the importance of liquidity in the banking system (BCBS, 2010a). Basel-I and II were mainly focused on credit risk and capital adequacy norms (Heid, 2007). However, during GFC, even though banks located in better regulatory quality and transparent countries had enough capital, they still got trapped in liquidity crunches and failed (Anginer, Demirgüç-Kunt, & Mare, 2018). As a result of this, the Basel committee has introduced two liquidity management norms, the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR)¹¹.

The objective of the proposed liquidity measurement norms is to strengthen the resilience of the banking system to both short-term and long-term liquidity stresses. For the short term LCR, the Basel committee proposed that banks maintain unencumbered high-quality liquid assets (HQLA)¹² to cover the net cash outflow¹³ for 30 days in the stressed time period. The cash outflow consists a certain percentage of run-off factors for deposits and wholesale funding while calculating the LCR¹⁴. Although among all external liabilities retail deposits¹⁵ are considered the most stable sources of funding, it is still divided into two parts i.e. stable deposits¹⁶ and less-stable deposits¹⁷ to assign varying run-off factors according to their stability. Stable deposits attract between 3 percent and 5 percent run-off factors and less stable deposits attract 10 percent and higher run-off factors. Retail deposits are also divided based on the characteristics (features) of deposit products such as transaction deposits and time

¹¹ Basel committee has also includes other monitoring tools such as reporting and managing the contractual maturity mismatch and concentration of funding, among other metrics such as estimation of the availability of unencumbered assets, LCR by significant currency and market-related monitoring tools¹¹(BCBS, 2010b, 2013).

¹² The HQLA are assets which are available in cash form or can be converted in cash easily and immediately without a significant loss by selling in the market or repo (BCBS, 2013- <https://www.bis.org/publ/bcbs238.pdf>).

¹³ Total net cash outflows over for the 30 calendar days = Total expected cash outflows – Min (total expected cash inflows; 75% of total expected cash outflows). The cash inflow and outflow should include expected interested payments during this period.

¹⁴ Run off factor for retail deposits- 3%, 5%, and 10% depending on the depositors' profile and deposit products. Wholesale funding- 5%, 10, 25% 40% and 100% depending on the customers' profile. For more details <https://www.bis.org/publ/bcbs238.pdf>

¹⁵ Retail deposits are the deposits which are deposited by households (individual).

¹⁶ Stable deposits are the insured deposits and the deposits made by the depositors, who have some established relationship such as loan against deposits and salary accounts.

¹⁷ Less stable deposits are the deposits which are not considered stable deposits.

deposits¹⁸. However, time deposits attract 0 percent run-off factor, if they have a maturity more than 30 days.

To maintain long-term resilience from liquidity stress, Basel committee has proposed the NSFR, in which banks should maintain 100 percent or more stable funding for a year to cover the total required stable funding. The Basel committee has considered household deposits more stable than any other type of deposits or funding. Thus, it has assigned higher weights¹⁹ to household deposits (contractual and non-contractual) for NSFR (BCBS, 2014).

In addition to the LCR and NSFR, banks are also asked to report the contractual maturity mismatch²⁰ and concentration of funding²¹ as a part of liquidity monitoring tools (Pohl, 2017). These measures help banks focusing on attracting deposits and making the banking system resilient (BCBS, 2010b). The impact of the Basel norms started appearing in the banking system, as shown in Figure 2 where deposit funding in the United States increased to 77 percent in year 2018 from 66 percent in year 2008.

It is evident that through the Basel standards, regulatory authorities are encouraging banks to increase not only the proportion of retail deposits but also the proportion of time deposits in their portfolio to make the banks more stable. To achieve this aim, it is also important for banks to identify the factors that affect bank deposits. Considering the importance of bank deposits for financial stability, this thesis highlights the role of three key factors viz. the development of the human capital, the development of the financial markets, and competition within the banking system that affect bank deposits, bank deposit funding and

¹⁸ The time deposits which attracts significant penalty on early withdrawal and made by the retail and small business owners are only attracts 0 percent run-off factor.

¹⁹ Weights are based on the stability of funds. More stable funds will have higher weights.

²⁰ Contractual maturity mismatch is a gap between the long-term illiquid assets and the short-term and liquid liabilities (Pohl, 2017).

²¹ Concentration of funding refers banks' funding structure (Pohl, 2017).

composition. A brief overview and the contribution of the three essays are discussed in the following section.

1.2. Overview of the thesis and contribution

This thesis aims to examine four key questions in three separate essays regarding the determinants of bank deposits, bank deposit funding, and composition in a cross-country set up. The first essay focuses on the effects of human capital development on the usage of the banking system in terms of bank deposits. The second and third essays investigate the impact of financial markets development and deposit competition on bank deposit funding and composition.

The first essay investigates the impact of human capital development on the banking system. Human capital development includes the development of healthcare system and education in the country (Todaro & Smith, 2010). In this essay, it is assumed that an effective and accessible healthcare system increases life expectancy²², which changes the motivation for savings such as retirement, bequest, and travel. Changes in people's financial situation and motivations change financial decision-making and their usage of banks and other financial systems. Good health also allows households to reap the benefits of education for a longer term. Moreover, most studies claim that education is one of the important determinants of using the formal financial system (Demirguc-Kunt & Klapper, 2012; Zins & Weill, 2016). It is intuitive that even though the use of the banking system is not difficult, a basic level of education is required to manage bank accounts. Thus, good health and at least a primary education are basic requirements for a household to use the banking system. The first interaction between

²² A better health system can prevent death from diseases either by providing a better medical treatment on time or by providing preventive measures to the diseases (Preston & Ho, 2009).

households and banks happens through the transaction accounts. Hence, this study focuses on the impact of human capital development on bank deposits.

H1: Human capital development increases bank deposits.

Panel data for 70 countries covering the period 2005 to 2015 has been used to examine the impact of human capital development on bank deposits. Since a two-way relationship between human capital development and economic development has been identified, it is inferred that there is a two-way relationship between human capital and financial development. To address this reverse causality, 2SLS and system GMM have been implemented. Results confirm that government expenditure on the healthcare system has a positive impact on bank deposits in low and middle-income countries. The coefficient for government expenditure on healthcare systems is greater than those for public and private compulsory contributions to healthcare systems primarily in low and middle-income countries. The public and private compulsory contribution to healthcare requires contributions from households, which reduces their disposable income, thereby reducing their deposits in banks. Moreover, the improvement in the healthcare system affects bank deposits in countries with high financial inclusion more than in countries with less financial inclusion. The development of financial markets also affects people's investment behavior. The dataset has been divided into bank-based and market-based economies, with a higher impact of the healthcare system in market-based economies than in bank-based ones.

The relationship between education and usage of the banking system has been investigated in terms of obtaining loans, accessibility of the financial system, and savings (Demirgüç-Kunt & Klapper, 2013; Xiao, 1996). The relationship between education and bank deposits has had limited attention from researchers. The positive relationship between education and bank deposits show that education helps individuals in using the banking system,

thereby increasing bank deposits, but mainly in high-income countries and bank-driven economies. The results do not show a statistically significant relationship between education and bank deposits in countries with lower financial inclusion²³. A significant positive relationship between education and bank deposits in countries with high financial inclusion suggests gaining the benefits of education in terms of bank deposits, it is required to provide an access to the financial system to households.

Once human capital is developed, it accelerates economic growth. This growth then leads to the development of other financial systems such as equity, derivative, bond, money markets, and insurance. The development of financial markets affects households' use of the banking system. This changing behavior of households compels banks to use other sources of funds, which ultimately impacts on bank deposit funding and composition. Thus, the second essay focuses on the impact of financial markets development on bank deposit funding and composition. The financial market development variables include measures for development such as accessibility, efficiency, and depth of financial markets. The general perception is that if financial markets grow, the usage of the banking system decreases, hence, both compete. In the financial system architecture literature, the relationship between these two systems has been investigated from banks' lending perspective (Song & Thakor, 2010). The second essay examines this relationship from the lens of banks' deposit funding profile. The relationship is examined separately in highly-financially developed economies, less-financially developed economies, and in high and in lower and upper middle-income countries.

²³ The selected countries which have higher percentage of account holders above the age of 15 than the mean value of percentage of account holders above the age of 15 of the datasets in the year 2014.

Figure 3 Factors impacting bank deposits



H2: The development of financial markets negatively affects banks' deposit funding and composition²⁴.

To examine the impact of financial market development on bank deposit funding and composition, panel fixed effects and 2SLS methods have been employed. The instrumental variable method (2SLS) has been used to address the reverse causality issue between financial markets development and bank deposits. The study uses panel data for 88 countries covering the period 2004-2014. This study departs from the traditional measurement tools of financial market development such as stock market capitalization to GDP ratio, stock-turnover ratio, stock turnover value, market capitalization value, and the number of listed domestic companies (Beck & Demirguc-Kunt, 2009) and employs financial market indices constructed by Svirydzhenka (2016). She has constructed financial markets indices, covering various factors such as efficiency, depth, and accessibility of financial markets. Moreover, she has created three financial markets' sub-indices based on depth, efficiency and accessibility.

The results confirm that the financial markets, in general, work as a competitor to banking systems in all countries. However, the positive relationship between the financial

²⁴ Bank deposit funding consists of total deposits over total assets. The negative impact of financial market development on bank deposit funding implies that the rate of growth of bank deposits will be less than for total assets which will decrease the proportion of bank deposit funding. The bank deposit composition consists of the proportion of retail deposits to total deposits and proportion of customer time deposits to total customer deposits. The negative relationship between financial market development and bank deposit composition suggests that the rate of growth of retail deposits and customer time deposit will be less than for total deposits and total customer deposits respectively.

markets index and bank deposit funding and composition in high financially developed economies suggest a co-evolution and complementary relationship. On the other hand, in less financially developed economies, the relationship between financial markets and the banking system is negative. These results are consistent with the findings of Song and Thakor (2010) who found that in a fragmented market, the banking and financial markets compete, but in financially integrated and developed markets, they complement each other²⁵.

This study contributes to the financial system architecture literature, which has attracted limited attention from researchers (Allen & Carletti, 2010; Boot & Thakor, 1997; Song & Thakor, 2010). It is also related to the financial integration, financial system, and economic growth literature (Fratzscher, 2002; Friedrich, Schnabel, & Zettelmeyer, 2013; Korajczyk, 1996). This study thus provides insights into the financial structure of countries based on their financially development level.

The development of financial markets takes away banks' monopoly in the financial system. Financial market development not only increases the competition between financial markets and the banking system, but it also enforces competition within the banking system. There is an extensive literature available on banking competition and concentration and their effects on factors such as stability, profitability, efficiency, and economic growth (Beck, De Jonghe, & Schepens, 2013; Berger et al., 2009; Boyd & De Nicolo, 2005; Carletti & Hartmann, 2002; Craig & Dinger, 2013). However, studies on the effects of deposit competition on bank deposit funding and composition are relatively uncommon.

Once banks face competition from external factors (financial markets), competition within the banking system also increases. Competition among banks increases banks' lending

²⁵ Song and Thakor (2010) argue that the development of capital market allows banks to acquire capital at a low cost. This capital can be used to finance the riskier loans it also allows banks to meet their higher capital requirements. Thus, both complement each other.

activities. To fund their lending activities, banks compete for deposits and other sources of funds through offering higher yields and better services. This deposit competition changes bank deposit funding and composition. Moreover, in highly concentrated markets, banks attract more deposits due to stronger brand image and trust factors. In highly concentrated markets, generally only a few banks operate. They are crucial for the economy; hence, households save money in the top banks under the assumption of their being too big to fail, which make them believe that these banks are stable²⁶. Although big banks get deposits from households, they opt for lower cost sources of funding to increase their profitability. Therefore, it is expected that bank deposit funding, retail, and time deposit proportions decrease in highly concentrated markets.

H3: Bank deposit competition increases the proportion of bank deposit funding, retail and time deposit proportions.

H4: A higher market concentration in the banking system reduces the bank deposit funding, retail and time deposit proportion.

To investigate the impact of deposit competition on bank deposit funding and composition, bank level data has been collected for 193 countries from the Bankscope. However, due to limited data availability, this study uses panel data for 75 countries only. These represent developed and developing economies covering the period 2005-2014. There are various approaches to measuring market power and competition such as the Lerner index, Herfindahl-Hirschman index, concentration ratio, and Boone indicators (Aghion, Bloom, Blundell, Griffith, & Howitt, 2005; Berger, Demirgüç-Kunt, Levine, & Haubrich, 2004; Bikker & Haaf, 2002; Spierdijka & Zaourasa, 2018). Craig and Dinger (2013) used the deposit rate offered by banks to measure deposit competition. However, due to limited availability of data,

²⁶ See, for example, Iyer, Lærkholm Jensen, Johannesen, and Sheridan (2019).

the interest cost of average interest-bearing liabilities has been used as a proxy for deposit competition. HHI at deposit and loan levels have also been employed to identify the effect of market structure on bank deposit funding and composition.

The results show a negative relationship between bank deposit funding and deposit competition in two datasets- all countries and less financially developed countries. On the other hand, the relationship between deposit competition and bank deposit funding is insignificant in highly financially developed economies. In less financially developed economies, deposit competition assists banks in attracting retail deposits, whereas in higher financially developed economies, banks use other sources of funding as competition for deposits becomes more intense. This negative relationship between deposit competition and bank deposits is consistent with use of the interest cost of retail deposits as a proxy for retail deposit competition for both highly and less financially developed economies. The results show that in highly concentrated markets, banks use other sources of funding to reduce their costs and improve profitability.

This study contributes to the literature on bank deposit competition and bridges the gap between banking market structure and bank deposits competition by investigating the effects of market concentration on bank deposit funding and composition. In the financial world, this study will assist banks in using the interest rate effectively. This can aid banks in complying with the Basel-III liquidity norms of LCR and NSFR. Bank regulators can formulate regulatory policies to maintain robust bank deposit composition, enhancing banking system stability. This creates synergies for banking system regulators and the competition control authority in monitoring a country's banking market structure.

1.3. Outline of the thesis

The reminder of the thesis is constructed as follows. Chapters 2, 3, and 4 show the research details, including the reviews of prior research and answers to the four hypothesis questions, respectively. Chapter 5 provides a discussion of the findings and a conclusion.

2. Effects of human capital development on bank deposits

2.1. Introduction

The pandemic (COVID-19) has made us realize that how important is to have a good healthcare system, income (savings), and education level in a country to combat any uncertain events (Ahmed, Ahmed, Pissarides, & Stiglitz, 2020). Italy even though, it is among the top-ranked countries in terms of healthcare facilities, still failed in providing healthcare facilities to its citizens (Pearson & Triglione, 2020; Tandon, Murray, Lauer, & Evans, 2000). Similarly, India is struggling in providing healthcare facilities to people due to its poor healthcare system. This problem has intensified due to low literacy rate in the country²⁷. Therefore, governments around the globe are realizing that they need to work on the development of human capital. Better education, health, and income improves the quality of lifestyle and productivity, which eventually determines the economic growth (Jimenez, Nguyen, & Patrinos, 2012). This also determines their saving behavior and use of the financial system (Lusardi, 2008). This essay aims to study the impact of human capital development on the banking system especially on bank deposits. I employ healthcare expenditure and education index to measure the human capital development in the country.

Health expenditure is one of the biggest causes of bankruptcy in the United States. It is estimated that around 530,000 families file for bankruptcy every year in the United States due to heavy medical expenditures (Konish, 2019). According to Miller, Hu, Kaestner, Mazumder, and Wong (2019) nearly 20 percent of the population reported medical debt in their credit report in the United States. These medical expenditures arise due to sudden health shocks in the family, and in most cases households are not prepared financially for such events (Fisher & Montalto, 2011). The intensity of health shocks is severe when the main breadwinner falls

²⁷ The Indian government is finding difficulty in reaching out to people to inform them about the pandemic due to the country's low literacy rate.

sick (Naraya, Patel, Schafft, Rademacher, & Koch-Schulte, 2000; Sun & Yao, 2010), causing loss of income and savings to households. To combat health shocks and uncertain medical expenditures, households save money in good times (Deaton, 1989; Jappelli, Pistaferri, & Weber, 2007), which is called precautionary savings. Precautionary savings depend on the income level of the household. A high-income earner can save relatively more than a middle-income earner. However, households with lower income may not have enough funds to even meet regular expenditure, making it difficult for such people to save for rainy days.

To address these issues faced by lower income households, in particular, many countries offer government sponsored healthcare system or promote public and/or private health insurance schemes. These measures assist households to cover uncertain medical expenditures. Households are also then able to reduce the proportion of precautionary savings, thus allowing for consumption, and savings for retirement and/or lifestyle. A better and accessible healthcare system increases life expectancy, which further changes the motivation, as savings for retirement may become a priority (Preston & Ho, 2009). Changes in households' financial situation and motivations effect financial decision-making and their usage of the financial system. Among the participants within the financial system, the banks are often the first point of contact for households. Thus, a study that evaluates the impact of the healthcare system on bank deposits, taking into account a country's economic development level, is helpful for policy decisions.

In the human capital literature, education and health are often highlighted as the factors affecting economic growth. Education increases the personal skillset and productivity, and good health provides an opportunity to reap the benefits of that skillset and productivity for a long period. In contrast to health shocks, education encourages households to save by helping them understand and access more sophisticated financial products and financial systems. Most studies have shown that education is one of the important determinants of using a formal

financial system (Demirguc-Kunt & Klapper, 2012; Zins & Weill, 2016). Moreover, the role of education and financial literacy in portfolio allocation behavior has been explored extensively in portfolio management and savings literature (Lusardi & Mitchell, 2007; Lusardi & Mitchell, 2007; Van Rooij, Lusardi, & Alessie, 2011). The portfolio allocation behavior of households eventually influences the financial system of the country. To the best of my knowledge, research investigating the effects of education on bank deposits is limited.

The aim of this essay is to explore the influence of human capital development on bank deposits. This study has several policy implications. One is that the development of a healthcare system can improve work-life endurance, lifespan, and cognitive abilities of households, which, in turn, increases the income level and the saving behavior, thereby increasing bank deposits. Governments of low and middle-income countries should be cautious in promoting public and private contributions for the healthcare system. These contributions reduce households' disposable income, decreasing their usage of the banking system. The results show that education increases the cognitive abilities and skillsets that are used along with the good health to improve the income status of households. Education supports households' understanding of financial products. They use deposit products for transaction and saving purposes thus increasing bank deposits.

To accomplish this aim, I conduct regression analysis using 2SLS and GMM methods on panel data for 70 countries, including high-income and low and middle-income countries. I use four main variables, government expenditure on the healthcare system (in USD), government expenditure on the healthcare system (%), public and private compulsory contribution to healthcare system (in USD), and public and private compulsory contribution to healthcare system (%) to measure the healthcare development. I depart from traditional measures of education level in the country such as primary and secondary enrollment data due to limited and inconsistency in data availability. I use education index to measure the education

level in the country. The data is obtained from the United Nations Development Programme (UNDP). The macroeconomic variables data have been collected from the World bank. The Healthcare expenditure data is obtained from the World Health Organisation (WHO).

This paper contributes to the health economics literature studying the effects of health shocks on income and savings of households (Genoni, 2012; Wagstaff, 2007). It extends the work of Jappelli et al. (2007) who studied the impact of the quality of healthcare systems on income inequality in Italy. Their study was at the district level and found that districts with lower quality healthcare systems have increased income inequality, and that precautionary savings tended to increase in those districts. This essay examines the impact of the healthcare system on the financial system, the banking system in particular. This study explores the relationship between household incomes and the healthcare system and further contributes to the human capital and financial development literature by studying the effect of education on bank deposits.

The main findings of the research are as follows: public expenditure on improving the healthcare system increases bank deposits. This result is consistent across regions and the incomes levels of the countries studied. However, the impact of the healthcare system is more prominent in market-driven economies and the countries with high financial inclusion. The results also show that education plays a key role in increasing bank deposits, primarily in high-income countries. Moreover, good governance in countries encourages households to use the banking system, especially in countries with better regulatory qualities and less corruption.

The rest of the chapter is organized as follows: section 2.2 presents the prior literature related to health shocks, education, and savings. Section 2.3 discusses data collection, econometric methodologies and primary investigations. Section 2.4 and 2.5 comprises the

discussion and analysis of the main findings. Section 2.6 presents the validation of the findings by employing different control variables and section 2.7 provides the conclusion.

2.2. Existing literature

The literature on human capital and economic development discusses the effects of the health and education status of households on economic growth. In this section, the existing literature on the relationship between health shocks and economic and financial development is presented first. The later part of section discusses the role of education on the banking system.

Good health helps households by improving their productivity and earning capacity. Generally, a healthy person lives longer and can take more risks to earn income. Several studies show a positive relationship between income and health status (Deaton, 2003; Pickett & Wilkinson, 2015; Preston, 1980; Pritchett & Summers, 1993; Strauss & Thomas, 1998). Two types of income impact on health have been observed: one is direct, in which income allows households to access better medical facilities as and when needed. The second is indirect, in which income growth allows governments and households to attain a healthy environment such as access to water, proper sanitation, and healthy lifestyle that improves life expectancy (Marmot, 2002).

Some economists show a reverse causal relationship between health and income (Arora, 2001; Bloom & Canning, 2000). They state that health increases the productivity, clarity of thought, life expectancy and other factors improving earnings and therefore bank deposits (Well, 2007). Some economists believe that today's health is a function of various factors such as current and previous income, environment, education, and medical care (Deaton, 2003; Grossman, 1972). Case et al. (2002) studied the effect of economic status on the health status of children. They found that children from lower income households reach adulthood in poorer health conditions. Hence, literature shows a two-way relationship between health and income.

Income is used for consumption and savings. The consumption and savings of households depend on education, health status, and other macroeconomic factors. Poor health conditions affect savings in two ways: (i) it increases immediate consumption in terms of medical expenditure, hence, reducing savings. (ii) it increases the proportion of safe assets in the portfolio due to risk aversion. The study of health status and its impact on portfolio allocation is relatively new.

According to the life-cycle hypothesis, portfolio managers advise investors to increase the proportion of safe assets in their portfolio, as their customers' age increases (Basu & Drew, 2009; Bikker, Broeders, Hollanders, & Ponds, 2012; Campbell, Viceira, & Viceira, 2002). One of the main reasons for such advice is the risk that ageing deteriorates health conditions, which may increase medical expenditure (Edwards, 2008). Similarly, Rosen and Wu (2004) found that poor health conditions incentivize investors to decrease the proportion of risky assets. On one hand, poor health condition or health shocks decreases the proportion of risky assets, while on the other hand, it encourages households to increase their proportion of safe assets such as bonds, bank deposits, and treasury bills (Fan & Zhao, 2009). Yogo (2016) reported a negative relationship between the ratios of out of pocket health expenditure to income and the health status of the household. Moreover, Rosen and Wu (2004) reported that households sometimes decrease their investment in bonds, retirement accounts and stocks to smoothen consumption at the time of health shocks.

Households use multiple ways to meet their health expenses such as withdrawing savings, insurance, availing themselves of credit facilities, and selling assets. Wagstaff (2007) found that poor households in Vietnam rely on dissaving and informal credit to cover medical expenditures. Wagstaff and Lindelow (2010) obtained similar results in Laos. On the other hand, Genoni (2012) reported an insignificant relationship between health shocks and dissaving in Indonesia. However, according to the survey conducted by Lusardi, Schneider, and Tufano

(2011), 62 percent of households in the United States prefer using savings accounts (including retirement investments and investments with a penalty withdrawal facility) to cover unexpected expenditures. Similarly, in a recent study in India, Pradhan and Mukherjee (2018) reported a positive relationship between dissaving and health shocks.

Households' saving decisions depends on health insurance and the healthcare system of the country. If a country has comprehensive public health insurance, it reduces the financial damage arising due to health shocks, thereby discouraging households' precautionary savings (Cheung & Padieu, 2015; Hsu, 2013; Starr-McCluer, 1996). The same results are obtained via using government healthcare system (De Freitas & Martins, 2014; Jappelli et al., 2007). The reduction in precautionary savings increases surplus funds. A robust healthcare system provides improved medical facilities, which increases households' capability and life span. This increased life span and capability improve households' income, which they manage through a banking system either for consumption or for savings. This paper investigates the effects of health shocks on bank deposits at the macro level.

In the last few decades, the importance of financial education on households' financial decision-making have been widely explored (Bernheim, Garrett, & Maki, 2001; Cole, Sampson, & Zia, 2011; Lusardi & Mitchell, 2007). Lusardi and Mitchell (2007) reported that financial illiteracy is one of the main reasons for lack of retirement savings. Furthermore, according to the Lusardi et al. (2011) households' financial fragility survey in the United States, less educated households were more severely prone to financial difficulties. The study shows that financial literacy enhances households' skill sets in the optimal allocation of funds in high yield assets (Lusardi & Mitchell, 2011). Van Rooij et al. (2011) reported that around 23.8 percent of households hold stocks in the Netherlands. This percentage of stock ownership increases with education and financial literacy. Education enables households to understand and analyze financial products and use them according to their needs and desires.

To operate a bank account, one needs to be educated enough to at least read and write. Although bank employees generally help people who face difficulties due to their limited literacy in filling in forms for the deposits and withdrawals, they feel embarrassed and thus avoid such situations. Education gives confidence to households to operate a bank account. Hogarth, Anguelov, and Lee (2005) stated that amongst unbanked households, the proportion of less educated people were high. Demircuc-Kunt and Klapper (2012) showed education is one of the important factors in using the banking system. They found that people with higher education in developing and emerging economies are two times more likely to have formal accounts than the people with only primary education. According to the Cole et al. (2011) survey in Indonesia, the second most cited reason for people being unbanked is lack of knowledge of using a bank account. Hence, financial education helps households to understand sophisticated financial products and increases the usage of such products (Calvet, Campbell, & Sodini, 2007; Hilgert, Hogarth, & Beverly, 2003).

Several studies show that financial literacy is based on the cognitive abilities of households (Hogarth et al., 2005). Hence, they used education as a proxy for financial literacy. Most researchers reported a strong positive relationship between education and cognitive abilities. Sekita (2011) stated that people with higher education are more likely to be financially literate. Data related to financial literacy is not available for the selected countries; therefore, the education index (UNDP) has been employed as a proxy for the cognitive abilities of households in this paper.

2.2.1 Research objective

The objective of this essay is to identify the effect of human capital development on bank deposits at country level.

1. How does the development of human capital affects bank deposits at country level?

H1 : Human capital development increases bank deposits.

2.3. Data collection and methodology

I have collected data for bank deposit to GDP, stock traded value to GDP, commercial bank branching, inflation, bank stability (Z score) and per-capita income covering the period 2005 to 2015 from the World Bank Database. Data on political stability, regulatory quality, voice and accountability, control for corruption, and government effectiveness indexes are also collected from the World Bank Database. The data related to health care expenses such as out-of-pocket health expenditure, public and private compulsory contribution to health care financing schemes in value terms, public and private compulsory contribution to health care expenditure to GDP ratio, government expenditure on healthcare, and government expenditure on healthcare to GDP ratio have been obtained from the World Health Organization (WHO).

In human capital development literature, enrollment in primary school, secondary school, and government expenditure on education are used for the measurement of education level of the country (Baldacci, Clements, Gupta, & Cui, 2008; Loening, 2005; Ranis, Stewart, & Ramirez, 2000). However, the education index developed by UNDP has been used in this essay to measure the education level of the country. One of the main reasons for not using traditional variables is limited data availability. The education index developed by UNDP is constructed using the mean and expected years of schooling (UNDP, 2018).

Table 1 Variables' names, notations, and their expected signs

Variables' Name	Abbreviation	Measure	Expectation	Literature
Dependent Variable				
Deposit to GDP	DGDP	Log of Total Deposit to GDP		
Deposit Value	Deposit	Log of total Deposits		
Explanatory Variables				
Health				
Public and private	PPCCGDP	Log of public and private compulsory	Positive	Cheung and Padiou (2015); Hsu (2013);

Variables' Name	Abbreviation	Measure	Expectation	Literature
compulsory contribution to healthcare financing scheme to GDP (%)		contribution to healthcare financing to GDP		Starr-McCluer (1996); Wagstaff and Van Doorslaer (1992)
Public and private compulsory contribution to healthcare financing scheme	PPCC	Log of public and private compulsory contribution to healthcare financing	Positive	Kutzin (2001); Thomson and Mossialos (2006); Wagstaff and Van Doorslaer (1992)
Government Expenditure	GE	Log of government expenditure	Positive	Thomson and Mossialos (2006); Clemente, Marcuello, and Montañés (2008); Farag et al. (2013)
Government Expenditure to GDP	GEGDP	Log of Government expenditure to GDP		Guruswamy, Mazumdar, and Mazumdar (2008); Gupta, Verhoeven, and Tiongson (2002)
Out-of-pocket Expenditure per capita (USD)	OOPUSD	Log of out-of-pocket health expenditure		Self and Grabowski (2003); Farag et al. (2013); Damme, Leemput, Por, Hardeman, and Meessen (2004)
Education Index	EI	Education index designed by UNDP	Positive	Ghosh (2006); Iqbal and Daly (2014); Gürlük (2009)
Financial System				
Stability of Firm	Bank Z	Shareholders' fund/ Total Assets	Positive	Berger et al. (2009); Goetz (2018); Hakenes and Schliephake (2019); Fu, Lin, and Molyneux (2014)
Stock traded to GDP	STGDP	Log of stock traded to GDP	Negative	Beck, Demirgüç-Kunt, and Levine (2010); Levine (1997)
Macroeconomic factors				
Income	LINCOME	Log value of GDP per capita income	Positive	Barth, Lin, Ma, Seade, and Song (2013)
Inflation	Inflation	Country level consumer price inflation	Positive	Bourke (1989) Barth et al. (2013)
Economic Freedom Index	EFI	The index measures the economic freedom and state interference in financial system.	Negative	Krieger and Meierrieks (2016); Xu and Li (2008); Gropper, Jahera, and Park (2015); Chortareas, Girardone, and Ventouri (2013)
The World Governance Indicators	WGI	The world governance indicators measure the political stability,	Positive	Köhler (2015); Ahamed and Mallick (2019); Ashraf (2017); Beck,

Variables' Name	Abbreviation	Measure	Expectation	Literature
		regulatory quality, voice and accountability, rule of law, and control for corruption in the country.		Demirgüç-Kunt, and Levine (2006)

Data were initially collected for 110 countries, but this was later reduced to 70 countries due to the limitations in data availability. The data set of 70 countries covers 40 high-income, 15 low income and 15 middle-income countries. The countries are also distributed by region, covering East Asia and Pacific (EAP, 9), Europe and Central Asia (ECA, 30), Latin American and Caribbean (LAC, 10), the Middle East and North Africa (MENA, 9), North America (NA, 2), South Asia (SA, 2), and Sub-Saharan Africa (SSA, 4) (for more details see Appendix 1).

Due to the different income level of the countries, variables such as deposits to GDP, stock traded value to GDP, health expenses, trade openness, bank stability, have high variability. The deposits to GDP ratio varies from 11.98 percent to 263.13 percent. Similarly, the stock traded value to GDP ratio varies from 0 percent to 372.26 percent. The out of pocket expenditure of individuals shows high variation from USD 7.30 to USD 2,928 with the standard deviation 399. Hence, to normalize the variation in the dataset, I used the log value of deposit to GDP ratio (Jokivuolle, Pesola, & Viren, 2015), deposit value (Kraft & Galac, 2007), and health expenses (Bech, Christiansen, Khoman, Lauridsen, & Weale, 2011; Hartwig, 2008).

In the financial development literature, deposits to GDP ratio is generally used as a proxy for the usage of the banking system in the country; it has thus been used as the dependent variable in this study. Along with the deposits to GDP ratio, the total value of deposits has also been used as dependent variable to identify the change in total deposit base of the country.

Table 2 Summary statistics

<i>Variables Name</i>	<i>Observations</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min</i>	<i>Max</i>
Deposit to GDP	725	84.67	48.34	11.98	263.13
Log of Deposit	725	25.76	1.89	20.80	30.00
Public and private compulsory contribution to health Care financing scheme to GDP (%)	730	4.26	2.41	0.43	13.78
Public and private compulsory contribution to health Care financing scheme (in USD millions)	730	53,802	182,483	107	2,297,545
Government expenditure in Healthcare (in millions)	720	752	1,221	3.23	6826
Government expenditure in Healthcare to GDP (%)	730	35	11	11	65
Education Index	730	0.72	0.14	0.33	0.94
Stock Traded Value to GDP	719	36.44	51.86	0.00	372.26
Out of Pocket Expenditure in USD (OOPSUSD)	727	348.65	398.94	7.30	2,928.07
Inflation	730	4.72	4.85	-4.86	48.70
Bank Stability (Bank Z)	727	12.94	9.07	-0.34	48.90
Political Stability	730	0.11	0.94	-2.81	1.60
Voice and Accountability	730	0.40	0.87	-1.91	1.74
Government effectiveness	730	0.60	0.87	-1.21	2.44
Regulatory Quality	730	0.60	0.80	-1.30	2.26
Rule of Law	730	0.50	0.92	-1.35	2.03
Control for Corruption	730	0.45	1.01	-1.43	2.47
Economic Freedom Index	730	65.33	8.86	44.10	89.40
Per capita income (GDP)	730	22,464	21,343	599	91,617

2.3.1 Methodology

It is important to identify a robust econometric methodology to find the effects of healthcare system and education on bank deposits. In the economic development literature, healthcare and education are considered endogenous variables (Gilleskie & Harrison, 1998). Therefore, these variables are considered endogenous in this study too. Furthermore, I conduct an endogeneity test and find evidence for the endogeneity of these variables. I do not believe that this endogeneity is due to reverse causality between human capital (healthcare and education) and bank deposits. It is because of omitted variables, which also influence bank deposits of the countries, and which are correlated with the human capital. Literature suggests that depositors monitor banks (Diamond & Rajan, 2001) and penalize them by asking for higher interest rates on deposits or withdrawing funds from them (Egan et al., 2017). Hence, I treat bank stability as an endogenous variable. The Wu-Hausman test also suggests that bank stability is an endogenous variable. However, finding a suitable instrument for endogenous

variables is very difficult. In the absence of exogenous instruments, it is recommended using the lagged value of endogenous variables. I employ the lagged value of the endogenous variables, which are also considered in the system GMM model as valid instruments (Roodman, 2009). The results show that variables such as per-capita health expenditure (OOPSUSD), education index, and bank stability (Z score) are endogenous through the Wu-Hausman test.

The Hausman test confirms that the fixed effects method is suitable for this study. The heteroscedasticity test results favor using the heteroscedastic model. I do not find multicollinearity in the regressor variables through variance inflation factor (VIF) test. Bank deposits carry a lagged effect, which means that the deposits of period (t) depends on the deposits of period (t-1). The panel fixed effect OLS model gives biased results in such situations, whereas the dynamic panel data model would be applicable to address these issues. Although the dynamic panel data model is suitable for this dataset, I also employ the fixed effect and first difference models for preliminary analysis.

Arellano and Bond (1991) have proposed a two-step difference GMM estimator. In the first step, they assume that the errors are homoscedastic and estimate the residuals by using the first difference of the variables to eliminate the firm specific factors. The model uses the lagged level of variables as instruments. In the second step, the residuals are used to estimate the weighting matrix that makes the estimator asymptotically efficient and robust when the dataset is heteroscedastic. However, this model was later criticized by Blundell and Bond (2000) when instruments are weakly correlated with the first difference equation. They proposed the extended system GMM method that uses both level and first-differenced variables as instruments for each other to reduce the bias and provide better estimation even in the smaller dataset. The Windmeijer (2005) correction has also employed to make the two-step system GMM estimation more robust. Even though the system GMM is an advanced technique, it has

certain limitations such as using too many instruments. To avoid this situation, I use the collapse function to make the set of instruments smaller. The Hansen tests have been performed to check for the over-identification of instruments (Roodman, 2009). I also present the results of the two-step difference GMM estimator.

I apply the model on a full dataset of 70 countries to identify the effect of health and education on bank deposits. Then, the dataset is divided into two subgroups based on the income level of the countries and replicate the same model. The empirical model has the following form.

$$Y_{ct} = \beta_0 + \theta_c + Y_{ct-1} + \sum_{g=1}^G \beta_g X_{ct}^g + \sum_{e=1}^E \beta_e X_{ct}^e + \mu_c + \varepsilon_{ct} \dots \dots (2.1)$$

Where Y_{ct} is the dependent variables: ratio of bank deposits to GDP ratio and total deposits at a time "t" and of country "c". Y_{ct-1} is a lag of dependent variables of one year. θ_c - country fixed effects and μ_c presents the time effects. X_{ct}^g consists of the banking industry factors such as financial stability of the firm. X_{ct}^e indicates the vector of macroeconomic factors including the health expenses and the education index. ε denotes disturbance or error term.

2.4. Preliminary analysis

The relationship between the betterment of the healthcare system, education and the usage of the banking system for savings has been examined using the panel fixed effect (Appendix 2) and the first difference methods (Appendix 3). I use public and private compulsory contributions to healthcare in value (PPCC) and to the GDP ratio (PPCCGDP) in columns 1, 2, 5, and 6 and government expenditure on healthcare to GDP ratio (GEGDP) and an absolute term (GE) in columns 3, 4, 7, and 8. Columns 1-4 show the ratio of deposit to GDP

as a dependent variable whereas columns 5-8 use log of total deposits for the country as a dependent variable. This is to identify the trend of total deposits base. Seven out of the eight regressions show positive and statistically significant results. Columns 5-8 show higher coefficients for healthcare expenditures than columns 1-4. This shows that although the expenditure on healthcare system increases bank deposits, it also increases the country's GDP. Therefore, total deposits are showing higher coefficients for the healthcare system than the deposits to GDP ratio. The same results are obtained through first difference method, as shown in Appendix 3.

Another main explanatory variable is the education index. It does not show a statistically significant relationship with bank deposits using either panel fixed effects or first difference methods. With the control variables, I do not find statistically significant relationships between out-of-pocket health expenditure, stock traded value to GDP ratio or bank deposits in the fixed effects or first difference methods. I find a negative relationship between bank stability and bank deposits in the fixed effects method but do not find a statistically significant result with the first difference method. On the other hand, inflation shows a positive relationship in the first difference method, but no statistically significant relationship in the fixed effects method.

An interesting finding is the relationship between bank deposits and income. Both fixed effects and first difference methods show a negative relationship between income and the ratio of bank deposits to GDP and a positive relationship with bank deposit value. This indicates that income improves the country's total deposit base, but this does not translate into bank deposits in the same proportion. I employ the economic freedom index to measure the effect economic freedom and rule of law on bank deposits. Both methods, fixed effects and first difference, show a positive and statistically significant relationship between economic freedom index and bank deposits.

2.5. Discussion and analysis

This section discusses the main results of the study and presents the results of sensitivity analysis. The sensitivity analysis is conducted using (i) economic development level, (ii) financial inclusion level, and (iii) including different control variables.

This section presents 2SLS, two-step difference and GMM results for the entire dataset. As mentioned earlier, the first section (columns 1-4) of Table 3 presents the results for the dependent variable natural log of deposit to GDP ratio and the second section (columns 5-8) shows the natural log of the total deposit of the country as dependent variable. The same pattern is followed in other results tables. Four primary independent variables, public and private compulsory contribution to healthcare (PPCC), public and private compulsory contribution to healthcare to GDP ratio (PPCCGDP), government expenditure to healthcare (GE), and government expenditure on healthcare to GDP ratio (GEGDP) are used for measuring a country's healthcare system. Columns 1- 2 show a positive effect of PPCC, PPCCGDP on bank deposit to GDP ratio and columns 5-6 show the same effect on bank deposits, and the effects are statistically significant at 1 the percent level.

Table 3 Human capital (healthcare and education) development: bank deposits (2SLS)

The table presents the results for 70 countries for the period of 2005-2015. Columns (1-4) present the results for deposit to GDP ratio, whereas columns (5-8) show the results for total deposit value of the country. All the variables are in natural log form except bank stability, inflation, education index, and economic freedom index. I use bank stability, education index, per capital health expenditure as endogenous variables and the instrument variable for the same are lag-level variable of respective variables. In all regression equations, I employ firm fixed and year effects. The robust standard errors are in parenthesis. The sign ***, **, and * present the statistical significance at 1%, 5% and 10% level respectively.

	(1) Deposit to GDP	(2) Deposit to GDP	(3) Deposit to GDP	(4) Deposit to GDP	(5) Deposit	(6) Deposit	(7) Deposit	(8) Deposit
PPCC	0.278*** (0.0504)				0.457*** (0.0558)			
PPCCGDP (%)		0.325*** (0.0559)				0.361*** (0.0659)		
GE			0.0806*** (0.0297)				0.123*** (0.0297)	
GGEGDP (%)				0.464*** (0.0831)				0.557*** (0.0955)
Education index	1.108** (0.539)	1.163** (0.514)	1.859*** (0.543)	1.236** (0.521)	1.166** (0.558)	1.714*** (0.557)	2.510*** (0.620)	1.725*** (0.585)
Bank Z	-0.0190*** (0.00661)	-0.0213*** (0.00736)	-0.0224*** (0.00736)	-0.0174** (0.00681)	-0.0261*** (0.00931)	-0.0309*** (0.0112)	-0.0319*** (0.0111)	-0.0260** (0.0104)
OOPSUSD	0.292*** (0.0678)	0.254*** (0.0721)	0.214*** (0.0740)	0.180*** (0.0690)	0.189** (0.0793)	0.0933 (0.0992)	0.0550 (0.100)	0.0103 (0.0951)
Stock Traded to GDP	0.0279 (0.0173)	0.0271 (0.0168)	0.0286 (0.0181)	0.0272 (0.0168)	0.0276* (0.0165)	0.0279 (0.0170)	0.0279 (0.0182)	0.0276* (0.0168)
Inflation	0.000436 (0.00179)	-0.000168 (0.00191)	-0.000210 (0.00193)	0.0000858 (0.00179)	-0.00171 (0.00221)	-0.00276 (0.00254)	-0.00284 (0.00256)	-0.00245 (0.00237)
Income	-0.864*** (0.144)	-0.541*** (0.134)	-0.620*** (0.144)	-0.429*** (0.135)	0.0802 (0.143)	0.621*** (0.158)	0.495*** (0.169)	0.754*** (0.158)
Economic Freedom Index	0.0206*** (0.00305)	0.0215*** (0.00305)	0.0198*** (0.00318)	0.0213*** (0.00290)	0.0236*** (0.00317)	0.0237*** (0.00324)	0.0227*** (0.00345)	0.0236*** (0.00314)
F	20.38	20.53	16.12	20.94	60.15	55.70	52.82	67.73
r ²	0.370	0.378	0.324	0.409	0.689	0.653	0.629	0.675
N	640	640	635	640	640	640	635	640

However, the impact of healthcare expenditure on the total deposit base is stronger than the deposits to GDP ratio. This result is consistent with the preliminary analysis of the findings. As per column 1, the coefficient of PPCC is 0.278, when the deposits to GDP ratio has been used as a dependent variable. The same explanatory variable shows coefficients of 0.457, when total deposits are the dependent variable, as shown in column 5 of Table 3. A similar pattern has been observed for other explanatory variables. For example, PPCCGDP shows a coefficient of 0.33 for deposit to GDP and 0.36 for deposits, GE shows coefficients of 0.08 for deposits to GDP and 0.12 for deposits, and GEGDP shows 0.46 for deposits to GDP, and for deposits 0.56. The economic impact of these variables is also significant. For example, as per columns 1 and 5, a 10 percent increase in the PPCC will increase the ratio of deposits to GDP by 2.78 percent and it will increase a country's total deposits by 4.57 percent. Hence, for instance, a 10 percent increase in the public and private compulsory contribution to healthcare of Australia increases the deposit to GDP ratio by 2.78 percent. Similarly, a 10 percent increase in government expenditure on healthcare increases bank deposits by 1.23 percent in Australia.

Table 4 and Table 5 present the results of two-step difference GMM and system GMM methods. The difference GMM shows a positive relationship between the healthcare system and the bank deposits. Unlike 2SLS, difference GMM shows higher coefficients for the dependent variable the deposit to GDP ratio than for total deposits. Column 1 shows a coefficient 0.34 for PPCC when using deposits to GDP ratio as dependent variable, whereas the same variable shows the coefficient 0.30 when total deposits are used as the dependent variable. On the other hand, no regressions show a statistically significant relationship with system GMM methods, except column 2. Column 2 of Table 5 shows a negative but moderately statistically significant relationship, contrary to the findings from other methods. However, this result is significant at a 10 percent

level and seven out of the eight regressions are showing over-identification issues. Hence, I am cautious in inferring the results of system GMM. Instead, I rely on the findings of 2SLS which I discuss in the following sections.

Table 4 Human capital (healthcare and education) development: bank deposits (two-step difference GMM)

The table presents the results for 70 countries for the period of 2005-2015. Columns (1-4) present the results for deposit to GDP ratio, whereas columns (5-8) show the results for total deposit value of the country. All the variables are in natural log form except bank stability, inflation, education index, and economic freedom index. I use bank stability, education index, per capital health expenditure as endogenous variables and the instrument variable for the same are lag-level variable of endogenous variables. In all regression equations, I employ firm fixed and year effects. The robust standard errors are in parenthesis. The sign ***, **, and * present the statistical significance at 1%, 5% and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Deposit to GDP	Deposit to GDP	Deposit to GDP	Deposit to GDP	Deposit	Deposit	Deposit	Deposit
PPCC	0.337*** (0.0730)				0.289*** (0.0599)			
PPCCGDP (%)		0.345*** (0.0814)				0.287*** (0.0664)		
GE			0.136* (0.0700)				0.118** (0.0591)	
GGEGDP (%)				0.416*** (0.141)				0.293** (0.145)
Education index	4.042* (2.444)	5.204* (2.670)	5.230* (3.170)	4.255* (2.559)	3.284* (1.710)	4.325** (1.902)	3.816* (2.192)	3.853* (2.167)
Control Variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	567	567	562	567	567	567	562	567
No. of instruments	23	22	22	22	22	22	22	22
AR2 (p-value)	0.436	0.499	0.292	0.212	0.219	0.309	0.116	0.161
Hansen-J (p-value)	0.223	0.147	0.0800	0.0781	0.358	0.237	0.194	0.0342

Table 5 Human capital (healthcare and education) development: bank deposits (two-step system GMM)

The table presents the results for 70 countries for the period of 2005-2015. Columns (1-4) present the results for deposit to GDP ratio, whereas columns (5-8) show the results for total deposit value of the country. All the variables are in natural log form except bank stability, inflation, education index, and economic freedom index. I use bank stability, education index, per capital health expenditure as endogenous variables and the instrument variable for the same are lag-level variable of endogenous variables. In all regression equations, I employ firm fixed and year effects. The robust standard errors are in parenthesis. The sign ***, **, and * present the statistical significance at 1%, 5% and 10% level respectively.

	(1) Deposit to GDP	(2) Deposit to GDP	(3) Deposit to GDP	(4) Deposit to GDP	(5) Deposit	(6) Deposit	(7) Deposit	(8) Deposit
PPCC	-0.00785 (0.0206)				0.0252 (0.217)			
PPCCGDP (%)		-0.230* (0.129)				-0.255 (0.178)		
GE			0.0244 (0.0288)				-0.0290 (0.0341)	
GGEGDP (%)				0.0149 (0.175)				-0.0239 (0.128)
Education index	1.087 (0.765)	2.820** (1.367)	0.665 (0.682)	0.804 (0.953)	0.967 (2.036)	3.730* (1.906)	-0.386 (0.988)	0.430 (1.373)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	639	639	634	639	639	639	634	639
No. of instruments	28	26	28	28	28	28	28	28
AR2 (p-value)	0.190	0.140	0.260	0.204	0.0262	0.0569	0.0349	0.0455
Hansen-J (p-value)	0.00313	0.602	0.00634	0.00761	0.0281	0.0496	0.00347	0.00150

The results support the hypothesis that a better healthcare system improves households' savings, which eventually increases usage of the banking system for deposits. A better healthcare system, by improving health, enables people to save more. One of the interesting findings is that the coefficients of the public and private compulsory contributions to healthcare variables are higher than the government expenditures to healthcare system when total deposits are used as a dependent variable. The public and private compulsory contribution to healthcare includes the government expenditure on healthcare. Higher coefficients suggest that the private contribution of households encourages people to save more and hence increases their bank deposits and eventually increases a country's bank deposit base.

2.5.1 Economic development

Literature suggests that banking systems behave differently according to countries' economic development level (Demirguc-Kunt & Levine, 2008; Dietrich & Wanzenried, 2014; Gupta, Tressel, & Detragiache, 2005; Hoggarth, Reis, & Saporta, 2002). Therefore, the dataset has been divided into two subgroups, high-income countries and low and middle-income countries, based on the World Bank Database. The results for the subgroups are consistent with the main findings. Table 6 shows that the coefficients of PPCC and PPCCGDP are 0.32 and 0.38 for the dependent variable deposits to GDP ratio respectively. These coefficients increase to 0.58 and 0.54 respectively for the dependent variable total deposits. The coefficients of government expenditure to healthcare are also higher when using total deposits as the dependent variable. On the other hand, the coefficients of PPCC and PPCCGDP for both the dependent variables for low and middle-income countries are lower than for those higher income countries, as shown in Table 7. The coefficients of PPCC and PPCCGDP are 0.27 and 0.41, when using deposit to GDP ratio as dependent variable and the coefficients of the GE and GEGDP are 0.24 and 0.40 for the same

dependent variable. The economic significance of the healthcare system in high-income countries is higher than in the low and middle-income countries. This observation is consistent with the income and savings literature, which suggests that a dollar increase in the income of rich households increases their savings more than an increase for low and middle-income households. Moreover, the impact of government expenditure on healthcare on bank deposits in low and middle-income countries is relatively higher than in high-income countries. This may be due to existing poor healthcare systems in low and middle-income countries; a small improvement makes a larger impact in the system.

Table 6 Human capital (healthcare and education) development: bank deposits (high income countries-2SLS)

The table presents the results for 40 countries representative of high-income countries for the period of 2005-2015. Columns (1-4) present the results for deposit to GDP ratio, whereas columns (5-8) show the results for total deposit value of the country. All the variables are in natural log form except bank stability, inflation, education index, and economic freedom index. I use bank stability, education index, per capital health expenditure as endogenous variables and the instrument variable for the same are lag-level variable of respective variables. In all regression equations, I employ firm fixed and year effects. The robust standard errors are in parenthesis. The sign ***, **, and * present the statistical significance at 1%, 5% and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Deposit to GDP	Deposit to GDP	Deposit to GDP	Deposit to GDP	Deposit	Deposit	Deposit	Deposit
PPCC	0.315***				0.584***			
	(0.0486)				(0.0578)			
PPCCGDP (%)		0.384***				0.545***		
		(0.0593)				(0.0808)		
GE			0.0697**				0.581***	
			(0.0271)				(0.178)	
GGEGDP (%)				0.430***				0.146***
				(0.133)				(0.0337)
Education index	0.962*	1.040**	1.409***	1.916***	0.859	1.423*	1.988***	2.764***
	(0.520)	(0.521)	(0.534)	(0.584)	(0.657)	(0.734)	(0.734)	(0.802)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F	21.96	20.80	15.67	13.07	29.56	21.48	17.21	15.87
r ²	0.505	0.492	0.466	0.399	0.683	0.587	0.557	0.520
N	359	359	359	354	359	359	359	354

Table 7 Human capital (healthcare and education) development: bank deposits (low and middle-income countries-2SLS)

The table presents the results for 30 countries representative of low- and middle-income countries for the period of 2005-2015. Columns (1-4) present the results for deposit to GDP ratio, whereas columns (5-8) show the results for total deposit value of the country. All the variables are in natural log form except bank stability, inflation, education index, and economic freedom index. I use bank stability, education index, per capital health expenditure as endogenous variables and the instrument variable for the same are lag-level variable of respective variables. In all regression equations, I employ firm fixed and year effects. The robust standard errors are in parenthesis. The sign ***, **, and * present the statistical significance at 1%, 5% and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Deposit to GDP	Deposit to GDP	Deposit to GDP	Deposit to GDP	Deposit	Deposit	Deposit	Deposit
PPCC	0.272*** (0.0963)				0.305*** (0.0856)			
PPCCGDP (%)		0.405*** (0.0859)				0.338*** (0.0834)		
GE			0.236*** (0.0715)				0.432*** (0.0986)	
GGEGDP (%)				0.400*** (0.114)				0.212*** (0.0634)
Education index	-0.0725 (1.122)	-0.667 (1.075)	0.255 (1.080)	0.118 (1.010)	-0.380 (1.009)	-0.583 (0.991)	0.0180 (1.020)	0.0171 (0.962)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F	12.71	13.70	12.50	11.07	74.62	75.14	80.62	67.77
r ²	0.374	0.415	0.434	0.386	0.796	0.804	0.817	0.797
N	281	281	281	281	281	281	281	281

Moving to another main variable, the education index, a positive and statistically significant relationship between education and bank deposits is found. Columns 1-4 of Table 3 show coefficients ranging between 1.10 and 1.90 for the first dependent variable, whereas the same coefficient are in the range of 1.17 to 2.51 for the second. The same positive relationship has been found through the difference GMM method. The coefficients are significant at the 10 percent level. Table 5 shows that the two regressions are statistically significant when using the system GMM method. Hence, the relationship between education and bank deposits are consistent with different methodologies. This result is consistent with the literature which suggests that education increases use of the financial system for savings (Demirguc-Kunt & Klapper, 2012).

Like the healthcare system, education increases both the country's total income and total deposits. The effects of an increase in deposits is lower than the increase in country's income. Therefore, the coefficients for total bank deposits are higher than the bank deposits to GDP ratio.

This relationship is further verified through two subgroups of the datasets. I find a consistent positive relationship between education and bank deposits in high-income countries, whereas the relationship between education and bank deposits is insignificant in low and middle-income countries.

The other important variable is bank stability, which influences depositors' behavior in using the banking system. I find a negative and statistically significant relationship between bank stability and bank deposits in all countries. The coefficients of this variable are in the range of 0.02 to 0.03, as shown in Table 3 . I also estimate this relationship through difference and system GMM model but do not find a statistically significant relationship, except using GEGDP as a main independent variable and total deposit as dependent variable, which shows a contrary relationship. The negative relationship is consistent in the high-income countries. This result may be due to two reasons: one, as banks become more stable, they increase funds from other sources such as interbank borrowings, short-term, and borrowing from the central bank, therefore, decreasing their bank deposit funding. Two, stable banks offer relatively lower interest rates, which is a disincentive for households to deposit funds (Calomiris & Kahn, 1991; Diamond & Rajan, 2001). I do not find a statistically significant relationship in low and middle-income countries.

An individual's health shocks play a key role in their income and saving. To test this, out-of-pocket per-capita health expenditure is employed as a control variable and I find a positive and statistically significant impact on bank deposits using 2SLS method. The difference and system GMM methods do not show a statistically significant relationship, except in one system GMM regression. I find a negative relationship in that regression but significant only at the 10 percent level (see Table 3). I am cautious to interpret this result due to the over-identification issue. Hence, I conclude that households save money to combat health shocks. I further estimate the impact of

the variable on the subgroups. Similar positive relationships in low and middle-income countries have been observed, but the relationship in higher-income countries cannot be determined. One of the main reasons for this finding is that the low and middle-income countries generally do not have an effective healthcare system²⁸. Therefore, households rely on their savings to meet a health shock, incentivizing households in low and middle-income countries to save more.

I envisage that the development of financial markets affects bank deposits, since it provides an alternative channel for savings. I employ the stock market turnover value to GDP ratio as a control variable²⁹. Table 3 does not show a statistically significant relationship in all countries, except in column 5 and 6. However, the coefficients are significant at the 10 percent levels only. A similar trend is observed with the difference GMM method and in high-income countries. Moreover, the results of low and middle-income countries are not statistically significant. Hence, the relationship between the stock market development and bank deposits cannot be determined.

Table 3 shows an insignificant relationship between inflation and bank deposits in all countries. The same results are obtained through difference and system GMM methods. This same pattern is followed in low and middle-income countries. On the contrary, a negative relationship between inflation and bank deposits in higher income countries has been found, as shown in Table 6. This negative relationship suggests that households in higher income countries are rate sensitive. They recover their inflation cost by investing in high yield assets.

The impact of per capita income on bank deposits has also been examined. Columns 1-4 of Table 3 show a negative relationship between income and bank deposits, whereas columns 5-8

²⁸ The average public and private contribution to GDP ratio in lower- and middle-income countries was 2.54 percent in 2014, whereas in high income countries it was around 6.10 percent.

²⁹ This is one of the many variables, which measures the financial market development of the country. However, an in-depth study on this front is the out of scope for the paper.

show a positive relationship with bank deposits. The dependent variable in column 1-4 is bank deposit to GDP ratio, whereas the dependent variable in columns 5 to 8 is total bank deposits. The inverse relationship between income and the two dependent variables suggests that although income has a positive impact on bank deposit, the relationship with the GDP is relatively higher than for bank deposits. This trend is consistent in both subgroups viz. high-income and low and middle-income countries.

I also use the economic freedom index as a control variable. The economic freedom index measures a country's business, trade, fiscal, government spending, monetary, investment, financial, and property freedom. I find that economic freedom has a positive impact on bank deposits, as shown in Table 3. The same relationship has been estimated through difference and system GMM methods; I do not find a statistically significant relationship. The 2SLS findings are consistent with the fixed effects and first difference methods. Hence, I infer that the relationship between the two variables is positive. This positive relationship is consistent with the subgroup regressions' finding. Moreover, the impact of the variable in low and middle-income countries is relatively smaller than in high-income countries.

In addition to subgroup analysis, I also used dummy variables for high-income countries in the full dataset to identify the impact of high-income countries. The results are broadly consistent with the main findings³⁰.

2.5.2 Bank based economy and market-based economy

Although stock market turnover to GDP ratio has been employed to control for the effect of financial market development, the relationship between the independent and the dependent

³⁰ The results are available upon request.

variables in the bank-based and financial market-based economies has also been investigated. Countries with a higher deposit to market capitalization ratio than the mean are classed as bank-based economies, and remaining economies are considered as market-based economies (Delis, Hasan, & Kazakis, 2013).

I employ the same set of independent variables as in the main model and find the same consistent relationships in both types of economies for the healthcare system (see Appendix 4 and Appendix 5). The sensitivity of health expenditure in market-based economies is higher than in the bank-based economies. Most of the high-income countries are market-based economies and low and middle-income countries are bank-based economies, consistent with the findings of Beck et al. (2010), with both markets following the same trends as high-income and low and middle-income countries. For the second independent variable, a positive and statistically significant relationship with the education index and bank deposits has been found in bank-based economies but not in market-based economies.

2.5.3 Financial inclusion

The effects of the education and healthcare systems will be higher in countries which have higher financial inclusion (Arora, 2012). The dataset is therefore divided into two subgroups, the countries with the high and the less financial inclusion. To identify the countries with high and less financial inclusion, I have taken the mean value of the percentage of account holders for the selected countries of year 2014. Countries with a higher percentage of account holders³¹ than the mean value are considered high financially inclusive countries and remaining are considered less financially inclusive. Due to limited data availability on the percentage of account owners over the

³¹ Account holders whose age is more than 15 years.

age of 15, the total number of countries for this study is reduced to 54, out of which 32 are high financially inclusive and the remaining countries are classed as less financially inclusive.

The relationship between the healthcare system and bank deposits in both groups of countries is positive and statistically significant. The impact of government expenditure on bank deposits is higher in the countries with high financial inclusion³².

2.6. Robustness

The economic development literature mentions that factors such as political stability and quality of governance play an important role in economic growth (Barth et al., 2013; Fratzscher, König, & Lambert, 2016). The variables political stability, voice and accountability, government effectiveness, regulatory quality, and control for corruption have been employed in the main model. To save space, I only discuss the findings of regressions using the governance indicators. These results are available upon request.

The relationship between the healthcare system and bank deposits are consistent with the main findings when political stability is used as a control variable. Similarly, the education index also has positive and statistically significant coefficients. However, I do not find a relationship between political stability and bank deposits. Similar relationships between healthcare, education and bank deposits are obtained when using voice and accountability as a control variable. Although a negative relationship between voice and accountability and bank deposits has been found in three out of eight regressions, I am cautious in interpreting these results due to the low significance level.

I employ government effectiveness as a control variable and find a positive impact of healthcare and education on bank deposits. The elasticity of the education index is higher than that

³² The results for high financially included and less financially included countries are available upon request.

obtained when using political stability and voice and accountability as control variables. Moreover, the results show a positive and statistically significant relationship between government effectiveness and bank deposits. The economic impact of government effectiveness is in the range of 0.29 to 0.39, which suggests that a one unit increase in government effectiveness increases bank deposits by around 30 percent.

Regulatory quality, a key variable of the World Governance Indicator, is used as a control variable in the main model. The relationship between healthcare, education and bank deposits do not change. Four out of eight regressions show a positive and statistically significant elasticity for regulatory quality on bank deposits. The coefficients are in the range between 0.11 and 0.16. This finding is consistent with the finding for government effectiveness, although the elasticity is slightly lower. I further use control for corruption in the main model. The relationship between the key independent variables and dependent variables are the same. Furthermore, the results show a positive impact for the control for corruption on bank deposits. Hence, I conclude that the relationship between healthcare, education and bank deposits do not change even after employing additional control variables. Moreover, among the World Governance Indicators, government effectiveness, regulatory quality, and control of corruption play an important role in determining bank deposits.

2.7. Conclusion

To the best of my knowledge, this essay is first to study the effects of individuals health expenses on bank deposits. The results show that the improvement in the healthcare system makes the banking system stable by increasing bank deposits. However, the impact of the healthcare system varies depending on countries' economic development level, market versus bank-based economies, and financial inclusion level.

The impact of government expenditure on the healthcare system on bank deposits is more than that of the public and private compulsory contribution to healthcare system, primarily in low and middle-income countries. It may be because public and private compulsory contributions to healthcare include the contribution from households, thereby reducing their disposable income. Hence, it reduces the households' deposit in banks. Although improvement in the healthcare system increases bank deposits, the impact of the healthcare system on GDP of the country is higher than for deposits. Thus, the elasticity of the dependent variable total deposit of the country is higher than the deposits to GDP ratio.

The results show a greater effect of the healthcare system on bank deposits in highly financial included and market-based economies than the less financial included and bank-based economies. This may be due to the better governance in the high financial included and the market-based economies. This relationship is examined by employing the World Governance Indicators in the study and as expected; the governance indicators showed a positive impact on bank deposits.

The relationship between education and the usage of the banking system has been investigated in terms of obtaining loans, access to financial system, and savings. However, the relationship between education and bank deposits has had limited attention from researchers. The positive relationship between education and bank deposits shows that education helps individuals in understanding and using the banking system, thereby increasing bank deposits mostly in high-income countries and bank-driven economies.

What are the policy implications of this study? Public expenditure on the healthcare system aims on one hand at improving capability and income, and on the other hand reducing household uncertainty as to expenditures. Several studies have shown the impact of health shocks on income (Deaton, 2003; Pickett & Wilkinson, 2015; Yogo, 2016) and savings behavior (Fan & Zhao, 2009;

Rosen & Wu, 2004). The relationship between public health insurance, the healthcare system and savings has also been explored (Cheung & Padieu, 2015; Pradhan & Mukherjee, 2018). Furthermore, education influences cognitive ability. Hence, it helps in improving households' saving decisions (Cole et al., 2011) and usage of the banking system (Demirguc-Kunt & Klapper, 2012). However, it is worth exploring how human capital development affects bank deposits.

To answer this question, I argue that a good healthcare system provides timely health services to households, which makes them healthy and increases their general capacities. Good health increases endurance, life span, and cognitive abilities that helps to improve the income levels of households. It insures households against financial damage that arises due to health shocks, thereby reducing the need for precautionary savings and increasing surplus funds. These funds can be used either for consumption or for savings, depending on households' incomes and life expectancy. However, for both consumption and savings households find convenience in using the banking system for managing their funds. In addition, bank deposits, being the first point of contact to financial system for households, increase. Education also enhances the financial decision-making abilities of households. It facilitates understanding how to use the banking system, thereby increasing bank deposits.

There are five suggestions from this essay for improving the bank stability by increasing bank deposits: (i) Government should focus on improving the healthcare system, which increases the income level of households and allows them to use that increased income either for savings or for consumption, thereby increasing bank deposits. (ii) Compulsory contributions by households for healthcare in low and middle-income countries reduce the disposable income of households. They discourage households from saving, thus reducing bank deposits. Thus, it is recommended to use private contribution methods cautiously in low and middle-income countries. (iii) Education

plays a key role in accessing the banking system mainly in high-income countries and highly financially included countries. Hence, it is advisable to develop a policy which increases the number of schooling years in the country, as this leads to increased use of the banking system. (iv) Good governance develops the trust of households in the financial system. This in turn increases the usage of the banking system for savings and transactions. (v) Higher bank stability incentivizes them to acquire low-cost fund to increase their profitability in high-income countries, bank-based economies, and high-financial included countries, causing fragility in the banking system. Therefore, banks should be vigilant on their funding portfolio even when they have adequate capital and are stable.

This study could provide stronger results if I were able to use microeconomic level data from household surveys. It would enable investigation of the relationship between households' characteristics and their usage of the banking system for savings. Moreover, banks generally provide both transaction accounts and non-transaction accounts and studying the relevance of human capital development on individual deposit products will enable better understanding of the usage of the banking system.

3. Effects of financial markets development on bank deposits

3.1. Introduction

There are two types of system that characterise a country's financial structure: market-based and bank-based systems (Beck et al., 2010; Levine, 2002). Market-based systems are based on the financial markets, which includes equity, bond, money, and derivative markets. Generally, the development of financial markets depends on there being a robust banking system. Moreover, both systems provide an investment channel for surplus holders (Allen & Carletti, 2010). Hence, they compete with each other by offering differing yields, better services and such (Hubbard & O'Brien, 2012a; Rajan, 1992). However, this view raises two questions. Is the growth of financial markets always at the cost of banking system? What kind of financial structure is required to attract depositors in the banking system?

One of the early contributors to the literature regarding financial system structure was Frankel, Montgomery, Friedman, and Gertler (1991), where they argued that the increase in the domination of market-based transactions caused a deterioration in the banking system during the 1980s, particularly in the United States. Other western countries were not untouched by this change. Allen (1993) reported a significant jump in the financing activities by the stock market in the United Kingdom in the second half of the nineteenth century. In financing activities, both banks and financial markets compete to attract providers of funds. This competition decreases the proportion of retail deposits (Hubbard & O'Brien, 2012a).

The level of competition between banks and financial markets depends on the level of financial inclusion and financial integration within the country and across countries. If financial inclusion is high, most people will have access to the formal banking system. Therefore, other financial institutions will need to compete with banks to attract bank account holders for investment. Such competition, if successful, will reduce investors' interest in using deposits products offered by banks (Gilkeson, List, & Ruff, 1999; Gurley & Shaw, 1955). On the other

hand, if financial inclusion is low, both systems have an opportunity to attract new savers who do not currently use the formal banking system. However, in the current regulatory environment, it is essential to have a bank account to invest in financial markets³³. Demirgüç-Kunt and Levine (1996) show a positive relationship between financial markets and the banking system. They argue that the international financially integrated countries are more likely to have large financial markets and banks. Hence, both systems not only compete but also complement each other in certain situations.

In their seminal 1997 paper “Financial System Architecture”, Boot and Thakor (1997) outline the various scenarios where banks and financial markets can coexist. For example, firms with a poor credit reputation go to banks for their financial needs whereas high rated firms are more likely to go to financial markets (p 726). Similarly, Chinn and Ito (2006) argue that a well-developed banking system is a precondition for the development of financial markets in less developed economies. Although banks and financial markets compete with each other to attract funders and borrowers, they also complement each other and co-evolve (Song & Thakor, 2010).

The financial system architecture literature mainly studies the relationship between banking and financial markets from a borrower’s perspectives. Since financial markets provide alternative investment and saving vehicles for households to those provided by banks, it is important to investigate the relationship between the banking system and financial markets. This affects bank deposit funding and composition (retail and time deposit proportions). However, very little research has been done on the impact of the financial markets development on the banking system from a funder’s point of view, which is primary focus of this study.

³³ Investment in financial markets- Before buying a stock from a stock market, we need three types of accounts viz. bank, dematerialization (a process, which converts the physical certificates into electronic forms), and trading accounts. Investors need to transfer money from their bank accounts to trading accounts through cheque or online to buy a stock. Thus, if an investor wants to invest in the stock market, he/she must open bank account first. This will increase the use of the banking system.

This essay examines how the financial markets of selected developed and developing economies have influenced deposit funding, retail, and time deposit proportions over the period 2004-2014 in 88 countries. There are various tools to measure the development level of the financial markets such as stock market capitalization to GDP ratio, stock-turnover ratio, stock turnover value, market capitalization value, and the number of listed domestic companies (Beck & Demirguc-Kunt, 2009). In this study, the financial markets indices constructed by Svirydzenka (2016) have been used. These indices cover factors such as efficiency, depth, and access to financial markets, to develop a financial market index. Moreover, she has produced three financial markets' sub-indices based on depth, efficiency and accessibility. The details of the indexes are available in Section 3.3.

According to the findings, financial markets generally work as a competitor to banking systems. However, this relationship turns into co-evolution and becomes complementary in highly economically and financially developed economies. I find a positive relationship between retail, time deposit proportions and financial markets development in highly financially developed economies. On the other hand, in less financially developed economies the relationship between these two systems is negative. The difference in the relationship in the high and the less financially developed economies are consistent even after controlling for various economic and political factors. This finding is consistent with the findings of Song and Thakor (2010) who argue that banking and financial markets compete in fragmented markets but in financially integrated and developed markets, they complement each other.

This essay contributes to the literature on financial system architecture, which has attracted limited attention from researchers (Allen & Carletti, 2010; Boot & Thakor, 1997; Song & Thakor, 2010). The study is also related to fast growing literature on financial integration, financial system, and economic growth (Fratzscher, 2002; Friedrich et al., 2013; Korajczyk, 1996). By studying the impact of deposit insurance on bank deposits, this essay

contributes to the literature on market discipline. Lastly, it also touches the literature related to economic and financial development by conducting the study in subgroups viz. high income, low income, high financially developed, and less financially developed economies.

This study has four clear policy implications. (i) The key stakeholders of financial system such as banks, financial markets, government, and regulators should work on financial openness and integration to make the banking system stable by increasing retail and time deposits. This increase will assist banks in complying with the Basel-III liquidity norms, the liquidity coverage ratio (LCR) and net stable funding ratio (NSFR). (ii) The positive impact of deposit insurance in less financially developed economies suggests that regulators should implement deposit insurance schemes to strengthen banking system stability. (iii) Interest rates are generally used to attract depositors, but they should be cautiously used in less economic and financially developed economies. (iv) Economic freedom and good governance improve the trust factor for the financial system in less developed economies, which motivates individuals to deposit their money in time deposits. Hence, regulators are advised to improve the quality of governance to improve countries' financial inclusion level.

The essay is organized in the following manner. Section 3.2 discusses the existing literature on financial markets, the banking system and financial structure. Sections 3.3 and 3.4 explain data collection, methodology and preliminary analysis. The empirical findings and their policy implications are included in Sections 3.5 and 3.6. Section 3.7 discusses the results obtained, including robustness testing, and concludes.

3.2. Prior literature on financial architecture

There have been numerous studies on the comparison between the effects of bank-based and market-based financial systems on economic growth. The literature on financial development is divided into two broader categories i.e. the bank-based and the market-based

views. Economists who support the bank-based system argue that banks play an important role in acquiring information related to firms and managers, improving capital allocation, and eventually aiding in economic growth (Arestis, Demetriades, & Luintel, 2001; Diamond, 1984; Levine, 1998, 2002). Rajan and Zingales (1998) highlight the benefits of relationship-based funding (bank-based system) in East Asia. They argue that a dominant banking system creates good relationships with firms, ensuring firms repay loans in the weaker regulatory environment.

Those economists who favour a market-based economy highlight the importance and benefits of financial markets in economic development (Beck et al., 2010; Levine, 1997, 2002). These economists argue that financial markets are more efficient in the dissemination of information, improving corporate governance, and capital allocation (Sirri & Tufano, 1995), which help in increasing the growth rate of the economy (Allen & Santomero, 1997; Greenwood & Smith, 1997; Levine, 1997; 1995). Tadesse (2002) states that a market based financial system outperforms in developed economies with good governance, whereas a bank-based system is more effective in underdeveloped and developing economies. Moreover, Levine and Zervos (1999) show that both strong financial markets and development of the banking system lead to a higher growth rate for the economy.

Another strand of literature developed in last two decades has found a negative relationship between financial system development and economic growth (Kaminsky & Reinhart, 1999; Ramey & Ramey, 1995; Schularick & Taylor, 2012). Rioja and Valev (2004) find a variation in the effects of financial development on economic growth, as per the income level of the countries. They show strong and positive effects of financial development on economic growth in the middle-income countries, which vanishes as the country reaches the high-income category. Similarly, Cecchetti and Kharroubi (2012) report a “U” shape relationship between financial development and economic growth. They state that there is a

point in the financial development, beyond which the financial sector negatively affects economic growth. Similarly, Arcand, Berkes, and Panizza (2015) indicate that once private credit to GDP ratio crosses the range of 80-120, it reduces economic growth. The relationship between economic growth and the financial system have been explored in different dimensions, but there is limited research on the relationship between financial markets and banking systems, which is the focus of this paper.

The similar business model, i.e. mobilization of funds from savers to borrowers, creates competition amongst financial intermediaries (financial markets and the banking system). However, due to differences in characteristics between the systems, investors and borrowers prefer one or the other, according to their requirements, expectations, and status. New borrowers or start-up companies prefer borrowings from banks, whereas high reputational firms go to the open market for funding (Boot & Thakor, 1997; Diamond, 1991). Similarly, Bolton and Freixas (2000) argue that large, safe firms like to finance their needs through equity or bond markets, whereas distressed or risky firms approach banks.

In the same way, from the investment side, investors with high risk-appetites are willing to invest directly in capital market, whereas low risk-appetite investors prefer banks for investment. According to Guiso and Sodini (2013), households' needs and expectations determine their choice of financial products and financial intermediaries. They further state that the institutional and regulatory environment shape the financial decisions of households. In the United States, the role of the political system and populism in increasing the number of banks in the financial system was significant, which created a fragile banking system in the country (Calomiris & Haber, 2015; Rousseau, 2016). The relative weakness of the banking system was one of the important factors for the evolution of financial markets during the industrial revolution in the United States (Bordo, Redish, & Rockoff, 2015). Thus, the economic situation, regulatory environment, and investors' behavior determine their choice of

system. Therefore, in any country, one system is used more than the other. The dominance of one financial system over another varies globally. In the United States, investors hold a large amount of equities and bonds compared to Japan (Allen & Carletti, 2010). This difference in household saving decisions and usage of the financial system determine the proportions of retail and time deposits in the banking system. To influence households saving decisions, both systems compete by offering higher yields and/or services.

Although both banks and financial markets have the same set of customers and compete with each other to attract them, banks provide a range of other services such as portfolio management, investment management and underwriting that assist both systems in co-evolution. Demirgüç-Kunt and Levine (1996) found a positive correlation between bank inefficiency and mispricing in the stock markets. They argued that a well-developed financial market needs an efficient banking system. Song and Thakor (2010) show three forms of relationships between banks and financial markets, competition, co-evolution, and complementarity according to their interdependency. In their theoretical paper, they argue that since banks play a crucial role in providing certification of securitization, there is a complementary relationship between financial markets and the banking system. They further state that as a stock market develops, it allows banks to raise funds for their financing activities. Hence, both the financial markets and the banking system co-evolve or complement each other in a well-developed financial system.

Most studies in financial architecture and structure literature investigate the impact of the financial system and their financing activities. Effects of financial market development on bank deposit funding and the retail depositors has attracted limited attention. This paper, therefore, focuses on how financial markets shape the banking system, especially deposit funding, retail and time deposit proportions in developed and developing countries.

3.2.1 Research objective

The objective of this chapter is to identify the effect of financial markets development on the banking system regarding their deposit activities.

H1 : Financial market development has a negative impact on bank deposit funding and composition³⁴.

H2 : The negative impact of financial market development on bank deposit funding and composition are higher in financially developed economies than in less financially developed economies.

3.3. Data collection and methodology

Bank-level financial statement data from the Bankscope database has been collected for 193 countries covering period from 2004 to 2015. However, in many countries the data was not consistently available for the entire analysis period. Hence, I identify banks which have at least 9 years of data from year 2004 to 2014 and covering more than 50 percent of the market share of total deposits of the country. Further, banks which have less than 9 years of interest expense to average interest-bearing liabilities are dropped. This exercise brings the sample from 193 countries down to 90 countries. Due to the unavailability of inflation data, Argentina and Georgia are dropped from the analysis. Thus, the final dataset consists of 88 countries (see Appendix 7 for a full list).

Three dependent variables, deposit funding, retail, and time deposit proportions have been used. Deposit funding is measured as deposit and short-term funding to total assets, retail

³⁴ The negative impact of financial market development on bank deposit funding implies that the proportion of bank deposits in relation to total assets will decrease. Similarly, the negative relationship between bank deposit composition and financial market development suggest that rate of growth of retail deposits and time deposits are less than the total deposits and total customer deposits. This makes the relationship negative.

deposit proportion as customer deposits to total deposits and short-term funding, and time deposit proportion as the proportion of time deposits to total customer deposits.

Macroeconomic data such as GDP growth rate, inflation, proportion of population aged over 65 year are obtained from the World Bank Database. The data related to the financial markets index, financial markets access index, financial markets depth index, and financial markets efficiency index developed by Svirydzhenka (2016)³⁵ have been obtained from the IMF database. Table 10 presents variables names, definition, and expected relationship with the dependent variables.

Generally, researchers use stock market turnover activity and market capitalization as indicators for financial markets development (Beck & Demircuc-Kunt, 2009). However, in this essay, financial markets index, financial markets depth index, financial markets access index, and financial markets efficiency index have been employed to measure the development of financial markets in the country. The financial markets depth index comprises the variables, stock market capitalization to GDP, stock traded to GDP, international debt securities of government to GDP, total debt securities of financial corporations to GDP and total debt securities of nonfinancial corporations to GDP ratio. The financial markets access index includes percentage of market capitalization outside of top 10 largest companies and total number of issuers of debt including domestic and foreign, nonfinancial and financial corporations. The financial market efficiency index considers the stock traded value to market capitalization ratio. Finally, the financial market index is constructed by combining the efficiency, depth and access to financial markets (Svirydzhenka, 2016).

This is the first financial market index capturing the information about the access to financial markets in the country. Ease of access to the financial system plays an important role

³⁵ See <https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B>

in a household financial decision making (Demirgüç-Kunt & Klapper, 2013). The indices not only cover the share market but also debt markets. They consider both domestic and international markets, which allow me to capture countries' level of financial integration. I further employ stock market capitalization and stock turnover to GDP ratios for robustness tests. Limited data availability causes reduction in the dataset to 50 and 53 countries for market capitalization and stock-turnover ratio validation respectively.

The main explanatory variables are country level data. I aggregate the bank-level variables into country level. Moreover, because the dataset shows high variability due to large differences in macroeconomic conditions, I employ the three years moving average method. This process reduces the year on year volatility and allows me to deal with missing data (Crane & Crotty, 1967; McCulloch & Baulch, 2000; Raudys, Lenčiauskas, & Malčius, 2013; Syntetos & Boylan, 2005). The Table 8 presents the summary statistics of regional and income level distribution of countries. The details of the countries according to region and income level are available in Appendix 7.

Table 8 Summary statistics of regional and income level distribution of countries

Row Labels	High income	Lower and upper middle income	Grand Total
East Asia & Pacific	5	5	10
Europe & Central Asia	27	11	38
North America, Latin America & Caribbean	2	8	10
Middle East & North Africa	8	5	13
Sub-Saharan Africa		17	17
Grand Total	42	46	88

Table 9 shows large variations in dependent variables e.g. retail deposit proportion ranges between 17 percent and 88 percent, whereas time deposit proportion has a range from 0.86 percent to 100 percent. Similarly, the financial markets access index, an explanatory

variable, has a range between 0.001 and 1.00. Equity capital moves in the range from -4.70 to 35. This clearly indicates the heterogeneity of the data.

Table 9 Summary statistics of variables

Variables Name	Observation	Mean	St. Dev.	Min	Max
Deposit Funding	900	76.79	7.71	42.01	92.05
Retail Deposit Proportion	900	63.27	13.43	16.59	87.94
Time Deposit Proportion	888	49.09	19.85	0.86	100.00
Financial Development Index	900	0.42	0.24	0.07	0.98
Financial Market Index	900	0.33	0.28	0.00	0.98
Financial Market Depth	900	0.34	0.31	0.00	0.99
Financial Market Efficiency	900	0.32	0.35	0.00	1.00
Financial Market Access	900	0.32	0.32	0.00	1.00
Interest Expenses	900	3.47	2.65	0.12	42.84
Equity Capital	900	12.01	4.39	-4.70	34.76
GDP per capita	900	19,505	22,128	165	113,066
CPI Inflation	872	4.94	5.42	-7.98	74.85
Per Capita Income Growth	900	2.36	3.37	-12.24	27.90
Economic Freedom Index	897	64.04	9.53	35.57	89.87
Voice and Accountability	900	0.20	0.95	-1.88	1.72
Rule of Law	900	0.29	0.98	-1.92	2.03
Regulatory Quality	900	0.42	0.89	-1.78	2.15
Political Stability	900	0.08	0.87	-2.08	1.57
Government Effectiveness	900	0.38	0.93	-1.27	2.36
Control for Corruption	900	0.29	1.03	-1.38	2.44

The notation and expected signs of the variables are shown below in Table 10.

Table 10 Variables' names, notations, and their expected signs

Variable	Notation	Measure	Expectation
Dependent Variables			
Deposit Funding	DF	Ratio of deposit and short-term funding to total assets	
Retail Deposit Proportion	RDP	Customer deposits to deposit and short-term funding	
Time Deposit Proportion	TDP	Time deposit to total customer deposit	
Banking Market:			
Interest costs to average interest-bearing liabilities	IC	Interest expenses/ Interest-bearing liabilities	Average Positive Craig and Dinger (2013); Egan et al. (2017); Hutchison (1995)

Variable	Notation	Measure	Expectation	
Stability of the firm	Capital	Equity to Total Assets	Positive	Berger et al. (2009)
Financial Market:				
Financial Market Index and sub-indexes: financial market access index (FMA), financial markets depth index (FMD), and financial market efficiency index (FME)	FMI	This index measures the accessibility, depth, and efficiency of financial markets.	Positive	Altunbaş and Thornton (2019); Mlachila et al. (2016); Dafe, Essers, and Volz (2018); Araujo, David, van Hombecck, and Papageorgiou (2017); Irlacher and Unger (2018)
Macroeconomic Factors:				
Countries' economic performance	GDPG	GDP Growth Rate	Positive	Bikker and Metzmakers (2005); Bolt, de Haan, Hoerberichts, van Oordt, and Swank (2012); Albertazzi and Gambacorta (2009); (Claessens, Coleman, & Donnelly, 2018)
Inflation	Inflation	Country level consumer price inflation	Positive	Bourke (1989) Barth et al. (2013)
Economic Freedom Index	EFI	The index measures the economic freedom and state interference in financial system.	Negative	Krieger and Meierrieks (2016); Xu and Li (2008); Gropper et al. (2015); Chortareas et al. (2013)
The World Governance Indicators	WGI	The world governance indicators measure the political stability, regulatory quality, voice and accountability, rule of law, and control for corruption in the country.	Positive	Köhler (2015); Ahamed and Mallick (2019); Ashraf (2017); Beck et al. (2006)

3.3.1 Methodology

The empirical model has following form:

$$Y_{ct} = \beta_0 + u_c + \theta_t + Y_{ct-1} + \sum_{g=1}^G \beta_g X_{ct}^g + \sum_{m=1}^M \beta_m X_{ct}^m + \sum_{e=1}^E \beta_e X_{ct}^e + \varepsilon_{ct} \dots \dots (3.1)$$

Where Y_{ct} is the ratio of deposit funding/ retail deposit proportions/ time deposit proportions of country c at a time t . u_c denotes the countries' fixed effects; θ_t time fixed effects. X_{ct}^g is the banking variables such as financial stability of the banking industry and interest costs. X_{ct}^m represents financial market indices. X_{ct}^e indicates country specific variables such as the GDP growth rate of the country, economic freedom index, and country level governance indicators. \mathcal{E} denotes disturbance or error term.

One of the primary concerns in determining a suitable econometric method is identifying the potential endogeneity of financial markets and other variables in the model. The financial development and economic growth literature suggest a bi-directional relationship between these two variables (Calderón & Liu, 2003). Moreover, Chinn and Ito (2006) argue a reverse causal relationship between banking system and financial markets. Equity capital and interest rates are also considered endogenous variables, due to their dependence on bank deposits. The hypothesis of endogeneity has been validated through the Wu-Hausman test. To address the endogeneity issue, I employ instrumental methods (2SLS). Another major problem with the instrumental variable method is identifying suitable instruments for the endogenous variables. Many researchers suggest using lag of endogenous variables as instruments, in the absence of external instrumental variables (Bellemare, Masaki, & Pepinsky, 2017; Reed, 2015).

The Hausman test results show that the fixed effects method would be suitable for this dataset. In a cross-country analysis, datasets are expected to show heterogeneity and this dataset is no exception. Multicollinearity (VIF) tests show multicollinearity for the variables associated with governance indicators, hence only one governance variable has been employed at a time. In addition to this, I expect a persistence in the behaviour of deposits, which means $\text{deposit}_{(t)}$ is dependent on $\text{deposit}_{(t-1)}$. In such situations, dynamic panel data methods would be suitable. I

use system GMM method proposed by Blundell and Bond (2000) along with two-stage least squares (2SLS) for the entire dataset. The two-step system GMM method uses both level and first-differenced variables as instruments that reduces bias and provides precise estimation. Though the two-step system GMM estimator is an advanced and robust technique, it has certain limitations, such as over identification of instruments. I address this issue by employing collapse function, which makes a smaller set of instruments. Further, Hansen tests have been conducted to explore the over-identification issue.

The panel fixed effects method has been used for the preliminary analysis. Later, I report 2SLS and system GMM estimation results for all countries. Further, the dataset is divided into two subgroups based on the income level of the countries, high income, and lower and upper middle-income economies. This division is to detect if the impact of financial markets development varies according to countries' economic development level. The classification of the high and the lower and upper-middle income countries are based on the World Bank Database. The dataset is further divided into two subgroups based on the financial development level of the countries, higher and less financially developed economies, to identify the effects of financial market development on bank deposits. The division into subgroups creates problems of over-identification of instruments; thus, 2SLS estimation method has been applied for the analysis of sub-groups. Moreover, two-stage least squares (2SLS) is an efficient method, due to implementation of fixed effects, which improves the precision of estimates (Baltagi, Bresson, & Pirotte, 2003; Delis et al., 2013).

3.4. Preliminary analysis

I start with baseline analysis using the panel fixed effects method for all countries. The explanatory variables of main interest are financial market index, financial market depth index, financial market efficiency index, and financial market access index. Results show a negative and statistically significant coefficient of financial market index using deposit funding as a

dependent variable. Column 1 of Appendix 8 shows that the coefficient of financial market index is -6.72, which is marginally statistically significant at 10 percent. This relationship is insignificant for the other dependent variables, retail and time deposit proportions. For the other explanatory variables, I find an insignificant relationship between deposit funding, time deposit proportion and financial market depth index. However, financial market depth shows a negative effect on retail deposit proportion. The financial market efficiency and financial market access index do not show a statistically significant relationship with the retail and time deposit proportions. The result shows a negative effect of financial market efficiency on deposit funding.

The impact of interest rates on the time deposit proportion is significant but the use of deposit funding and retail deposit proportion as dependent variables make the interest cost insignificant. The coefficients of interest costs are around 0.65 for time deposit proportion at the 5 percent significance level, meaning that a 1 percent increase in interest rates causes a 0.65 percent increase in time deposit proportion. Although bank stability shows a negative relationship with deposit funding, it does not show a significant relationship with retail and time deposit proportions. A negative relationship between bank stability and deposit funding shows that stable banks are keen on increasing their assets. This increase in assets may be funded by other sources such as wholesale funding, so that the proportion of deposit funding decreases.

The other macroeconomic variables such as inflation, GDP growth rate and economic freedom index have been employed as control variables. Inflation shows a negative impact on deposit funding. A negative impact of GDP growth rate on retail and time deposit proportions have been observed. This shows that as a country grows, households prefer liquid assets rather than time deposits, causing a reduction in time deposit proportion. Moreover, I do not find a

relationship between retail, time deposit proportions and inflation. On the other hand, results show a statistically significant negative impact of inflation on deposit funding.

3.5. Empirical findings and policy implications

The Table 11 presents main regressions results using 2SLS method. Columns 1-4 show the results for deposit funding, columns 5-8 and 9-12 present the results for retail and time deposit proportions respectively. For each dependent variable, I first employ financial market index (FMI) followed by financial market depth index (FMD), financial market efficiency index (FME) and financial market access index (FMA) to measure the impact of different dimensions of financial markets. The country fixed and time effects have been applied in all the regressions model.

Column 1 shows that the financial market index has a negative relationship with deposit funding. The coefficient is -7.6 percent at a 5 percent significance level. Similarly, financial market efficiency index shows a negative relationship with deposit funding but at a 10 percent significance level. I do not find a statistically significant relationship with financial market depth index or financial market access index. The negative relationship between financial market index and deposit funding suggests that an improvement in financial markets increases economic activity in countries, increasing the lending activities of banks³⁶. Banks generally face difficulties in attracting retail deposits to fulfil the sudden surge in lending demand, causing them to use wholesale funding, counterbalanced by a relative reduction in deposit funding (Huang & Ratnovski, 2011).

³⁶ Banks' lending activities and deposit both have increased over the period. However, the rate of growth of deposit base is lesser than the rate of growth of lending activities. Therefore, banks use wholesale funding to fill this gap.

Table 11 Financial markets development: deposit funding and composition for all countries- 2SLS

The table reports coefficient and robust standard errors are in parentheses. Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportions as dependent variables. In all regression equations, I employ country fixed and year effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lagged level variables as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion report the results for 88 countries, whereas time deposit proportion presents the result for 87 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Deposit Funding	(5) Retail Deposit Proportion	(6) Retail Deposit Proportion	(7) Retail Deposit Proportion	(8) Retail Deposit Proportion	(9) Time Deposit Proportion	(10) Time Deposit Proportion	(11) Time Deposit Proportion	(12) Time Deposit Proportion
Interest Cost	0.0967* (0.0568)	0.100* (0.0575)	0.105* (0.0569)	0.108* (0.0596)	0.702 (0.464)	0.657 (0.452)	0.712 (0.464)	0.710 (0.466)	0.984*** (0.307)	1.018*** (0.308)	0.966*** (0.306)	0.964*** (0.307)
Equity Capital	-0.735*** (0.114)	-0.726*** (0.117)	-0.732*** (0.115)	-0.713*** (0.116)	0.201 (0.259)	0.168 (0.253)	0.227 (0.262)	0.216 (0.253)	-0.140 (0.366)	-0.115 (0.371)	-0.167 (0.361)	-0.179 (0.360)
FMI	-7.599** (3.420)				-5.276 (8.130)				13.88 (10.36)			
FMD		-2.152 (3.177)				-16.67** (7.210)				18.25** (8.653)		
FME			-2.750* (1.547)				4.008 (3.553)				0.322 (5.589)	
FMA				-6.617 (4.825)				-4.575 (9.569)				9.304 (7.798)
Inflation	-0.133*** (0.0332)	-0.137*** (0.0336)	-0.136*** (0.0339)	-0.131*** (0.0337)	-0.248** (0.107)	-0.248** (0.103)	-0.253** (0.108)	-0.247** (0.108)	-0.192 (0.177)	-0.184 (0.179)	-0.187 (0.176)	-0.195 (0.177)
GDP Growth	-0.00842 (0.0560)	-0.0153 (0.0567)	-0.0182 (0.0560)	-0.0126 (0.0562)	-0.434*** (0.158)	-0.402** (0.158)	-0.446*** (0.156)	-0.437*** (0.159)	-0.914*** (0.150)	-0.938*** (0.152)	-0.890*** (0.146)	-0.900*** (0.146)
Economic Freedom Index	-0.186** (0.0816)	-0.182** (0.0795)	-0.176** (0.0815)	-0.175** (0.0803)	0.117 (0.184)	0.0610 (0.184)	0.129 (0.183)	0.125 (0.183)	0.245 (0.204)	0.290 (0.201)	0.226 (0.202)	0.229 (0.203)
F	8.447	7.993	9.123	8.095	2.243	2.602	2.217	2.209	16.37	16.28	15.95	15.50
r ²	0.203	0.196	0.206	0.198	0.0680	0.0794	0.0675	0.0673	0.229	0.229	0.233	0.235
N	689	689	689	689	681	681	681	681	680	680	680	680

The relationship between financial market indices and the retail deposit proportion is insignificant, except for the financial market depth index. Column 6 shows that as the financial markets depth index increases, customers' usage of the banking system decreases. The economic significance is also substantial. The coefficient of the financial market depth index is -16.67, suggesting a one-point increase in the depth of the financial markets, retail deposit proportion decreases by 17 percent. For example, the retail deposit proportion in Australia was 58.1 percent in 2014, decreasing to 48.22 percent in 2015 due to one-point increase in the depth of the financial markets, keeping other deposits constant. I further test the relationship between the financial markets and time deposit proportion. Columns 9, 11, & 12 show an insignificant relationship between financial market indices with time deposit proportion. Column 10 of Table 11 presents a positive impact of financial market depth on time deposit proportion. This positive relationship suggests that as financial market depth improves, households' saving activities increases, encouraging them to use time deposits.

Pricing of deposits is one of the key determinants to attract depositors into the banking system, therefore, it is used as a control variable. The relationship between interest cost and retail deposit proportion is inconclusive. The results show a positive impact of interest on deposit funding and time deposit proportion. The coefficients of deposit funding are in the range of 0.10 to 0.11, whereas the impact on time deposit proportion are in the range of 0.96 to 1.02. Columns 1 and 9 of Table 11 reveals that a one-point increase in interest rate causes 0.10 percent increase in deposit funding and 0.98 percent in time deposit proportion. The difference in elasticity is due to inclusion of checking and saving deposits in deposit funding, generally at low or no interest. Households use these accounts for liquidity and/or transaction purposes, and thus these accounts are less interest rate sensitive. On the other hand, time deposits are sensitive to interest rates, causing the higher coefficients for time deposit proportion.

Bank stability plays an important role in attracting deposits. To control for this, equity capital is used as a proxy for bank stability. Columns 1-4 show a negative relationship between capital and deposit funding. This may be due two reasons: one, stable banks acquire more assets by increasing loans and advances. Two, greater stability incentivizes and allows banks to acquire other sources of funding such as interbank and central bank borrowings, which are less costly than deposits. However, validating these hypotheses are beyond the scope of this essay. The effects of bank stability on retail and time deposit proportions have been examined, but none of the regressions results is significant.

Households generally use deposit instruments to combat inflation³⁷, thus, inflation has been used as a control variable. Contrary to this hypothesis, a negative relationship between deposit funding, retail deposit proportion and inflation has been found (see columns 1-4 and 5-8 for deposit funding and retail deposit proportion respectively). The same negative relationship is reported by Gambacorta (2008). They suggest that higher inflation creates a demand for deposits, causing a reduction in interest rates on deposits. The reduction in interest on deposits leads to lower deposit funding. Contrary to deposit funding and retail deposit proportion, time deposits proportion does not show a significant relationship with inflation.

GDP growth rate is also used as an instrumental variable in the model to control for economic growth of countries. Results do not show a significant relationship between deposit funding and economic growth. On the other hand, it shows a negative impact on retail and time deposit proportions. The elasticity for time deposits is greater than for the retail deposits. This suggests that households in high growth economies are willing to keep funds in liquid forms or be involved in more entrepreneurial activities, causing a reduction in retail and time deposits proportions (Gambacorta, 2008).

³⁷ Inflation increases the cost of living in the country. To maintain the cost of living in future, households save/invest their money in financial products such as deposits, bonds, and money market instruments.

An economic freedom index has been applied in the main model to measure the impact of regulatory efficiency, government size, openness of market and rule of law on bank deposit funding. The results of columns (1-4) show a negative relationship between economic freedom index and deposit funding. The elasticity is in the range of -0.18 to -0.19. The negative effect shows that economic freedom increases economic activity in the country. Thus, the demand for loans and advances from banks increases. To meet this demand, banks use other sources of funding thereby decreasing the proportion of deposit funding. The results do not show a statistically significant relationship with retail deposit proportion. Columns 9-10 show a positive relationship between economic freedom and time deposit proportion. The economic impact is also substantial. It suggests that better governance and regulatory efficiency improves the trust of households in banks, so that households keep their money as time deposits.

Table 12 reports the results of two-step system GMM method investigating the impact of financial market development on deposit funding, retail, and time deposit proportions. Columns 1-4 show a negative impact of financial markets development on deposit funding. The economic impact is in the range of 4 to 6 percent. According to column 1 of Table 12, a one-point increase in financial market index causes 6 percent reduction in deposit funding. Other sub-indices of financial market development also show negative effects on deposit funding. I do not find a statistically significant relationship between retail, time deposit proportion and financial market indices. The control variables of the main model have been replicated in the system GMM method. However, none of the control variables is significant, except equity capital. Columns 1-4 show a negative relationship between capital and deposit funding, consistent with the main findings. Using retail deposit proportion as the dependent variable changes the relationship to positive. It is statistically significant at the 10 percent only. Moreover, column 10 shows a negative relationship with time deposit proportion. I do not find a significant result in 2SLS method.

Since system GMM results have an over-identification issue, I am cautious in interpreting these results. A two-step difference GMM has also been conducted in all countries and find the same over-identification issue. The results are available upon request. In further analysis, the 2SLS results are presented, which are robust and do not have an over-identification problem.

Table 12 Financial markets development: deposit funding and composition for all countries- two-step system GMM.

The table reports coefficient and robust standard errors (in parentheses) for all countries. Columns (1-4) present the result for bank deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail deposit to total deposit and retail time deposit to total retail deposit as dependent variables. In all regression equations, I employ year effects. I use interest cost, equity capital, and financial market indices as endogenous variable. Moreover, Hansen-J test suggest that all the regressions results has over-identification issue. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Deposit Funding	(5) Retail Deposit Proportion	(6) Retail Deposit Proportion	(7) Retail Deposit Proportion	(8) Time Deposit Proportion	(9) Time Deposit Proportion	(10) Time Deposit Proportion	(11) Time Deposit Proportion	(12) Retail Deposit Proportion
Deposit Funding _{t-1}	0.557*** (0.162)	0.537** (0.176)	0.546** (0.185)	0.588*** (0.145)								
Retail Deposit Proportion _{t-1}					1.044*** (0.138)	1.344*** (0.119)	1.348*** (0.126)	1.279*** (0.100)				
Time deposit proportion _{t-1}									0.893*** (0.120)	0.931*** (0.119)	0.837*** (0.122)	0.874*** (0.105)
Interest Cost	0.0141 (0.0179)	0.0423 (0.0540)	0.0309 (0.0344)	0.0542 (0.0838)	-0.613 (0.663)	-1.065 (0.825)	-0.879 (0.758)	-0.968 (0.715)	0.266 (0.294)	0.272 (0.327)	0.152 (0.250)	0.196 (0.218)
Equity Capital	-0.405** (0.152)	-0.469*** (0.139)	-0.466*** (0.194)	-0.394*** (0.128)	0.175 (0.434)	0.589 (0.439)	0.782* (0.419)	0.698* (0.387)	-1.049 (0.662)	-0.870** (0.517)	-1.131 (0.694)	-1.052 (0.690)
FMI	-6.646** (2.880)				-3.985 (10.23)				7.619 (15.22)			
FMD		-4.326* (2.548)				-1.818 (10.55)				7.330 (8.728)		
FME			-3.952* (2.264)				9.986 (6.079)				-7.688 (7.318)	
FMA				-5.967* (3.459)				-8.120 (25.61)				7.605 (21.70)
Inflation	-0.0237 (0.0453)	-0.0160 (0.0510)	-0.0264 (0.0563)	-0.0228 (0.0405)	0.138 (0.127)	0.186 (0.187)	0.183 (0.172)	0.163 (0.160)				
PCI	0.191 (0.500)	-0.0360 (0.565)	-0.0587 (0.435)	0.246 (0.490)	0.881 (1.204)	2.099 (1.449)	0.948 (0.784)	2.542 (2.606)	-0.530 (1.997)	-0.363 (1.227)	1.632 (1.648)	-0.421 (2.649)
EFI	0.0177 (0.0578)	0.0222 (0.0526)	-0.0329 (0.0639)	0.0348 (0.0637)	0.0153 (0.0809)	-0.0371 (0.117)	-0.0484 (0.104)	0.0258 (0.290)	-0.0229 (0.198)	-0.0541 (0.186)	-0.0215 (0.197)	-0.0370 (0.267)
Observations	697	697	697	697	688	688	688	688	687	687	687	687
No. of Inst.	27	27	27	27	27	27	27	27	27	27	27	27
AR2 (p-val)	0.535	0.488	0.567	0.502	0.343	0.322	0.334	0.351	0.859	0.831	0.890	0.868
Hansen-J (p)	0.00850	0.00402	0.00662	0.00278	0.0556	0.00245	0.00136	0.00113	0.00764	0.00785	0.00975	0.00616

3.5.1 Relationship between financial market development and bank deposits: based on economic development level of countries

There is a two-way relationship between economic and financial development level of the countries. Literature suggests that initially economic development leads to financial development of the countries (Arcand et al., 2015; Cecchetti & Kharroubi, 2012; Law & Singh, 2014). Thereafter, financial development creates an environment conducive to economic growth (Durusu-Ciftci, Ispir, & Yetkiner, 2017; Hermes & Lensink, 2003). Therefore, to investigate the relationship between financial markets development and bank deposits according to economic development level, the dataset has been divided into two subgroups, high income and lower and upper-middle income countries, based on the definition in the World Bank database. Due to the small number of countries, I merge the lower and the upper-middle income countries into one group.

According to Table 13, none of the regressions for deposit funding shows significant results. Retail and time deposit proportions both show a positive relationship with the financial market indices. Column 5 shows the elasticity between the financial market index and retail deposit proportion is 33.69. Hence, a one-point increase in financial market index causes 34 percent of increase in retail deposit proportion. Moving to sub-indices of the financial market index, financial market depth index and financial market efficiency index show coefficients of 26.79 and 11.92 percent, as shown in columns (6-7). This relationship becomes insignificant when financial market access index is used as an explanatory variable. Similarly, columns 9, 10 and 12 show a positive impact of financial market development on time deposit proportion. This relationship turns insignificant with use of financial market efficiency index as explanatory variable (see column 11).

The positive relationship between banking system and stock market development is counterintuitive. It is however consistent with the finding of Demirgüç-Kunt and Levine

(1996), who reported a positive relationship between stock market development and the banking system. They stated that developed financial intermediaries accelerate the growth of financial markets. Moreover, Song and Thakor (2010) argued that banks and financial markets compete only when seen in isolation. When they are interdependent, they co-evolve. In developed economies, financial integration is high, which causes the coevolution of both the banking and financial markets. Similar findings are reported by Duong, Rhee, and Vu (2018), that bank managers in the United States observe short selling activities of clients' shares before taking lending decisions. This suggests that the information and activity of one market influences the other markets. Financial integration is not limited to the domestic market; it covers the integration with international markets that makes the market efficient and attractive for investment (Fratzscher, 2002).

Nowadays banks' business activities in developed countries are not limited to accepting deposits and lending. They also provide financial management services such as investment management, consultancy, and portfolio management. These services help financial markets in attracting investors and consequently help banks in attracting deposits that cause the coevolution of financial markets and the banking systems. Chinn and Ito (2006) argued that to improve a country's financial markets, it is essential to have a robust banking system. However, it is not always one way, such as banks supporting financial markets (Duong et al., 2018).

Table 13 Financial markets development: deposit funding and composition in high-income countries

The table reports coefficient and robust standard errors are in parentheses. Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportion as dependent variables. In all regression equations, I employ country fixed and year effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lagged level variables as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding, retail and time deposit proportion report the results for 42 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Deposit Funding	(5) Retail Deposit Proportion	(6) Retail Deposit Proportion	(7) Retail Deposit Proportion	(8) Retail Deposit Proportion	(9) Time Deposit Proportion	(10) Time Deposit Proportion	(11) Time Deposit Proportion	(12) Time Deposit Proportion
Interest Cost	0.134 (0.0903)	0.140 (0.0904)	0.131 (0.0888)	0.122 (0.0822)	-0.101 (0.168)	-0.117 (0.172)	-0.136 (0.169)	-0.186 (0.174)	1.241*** (0.329)	1.230*** (0.330)	1.191*** (0.328)	1.201*** (0.325)
Equity Capital	-0.823*** (0.262)	-0.792*** (0.264)	-0.838*** (0.257)	-0.835*** (0.256)	0.124 (0.364)	0.236 (0.352)	0.00807 (0.357)	0.0882 (0.351)	-1.137*** (0.396)	-1.056*** (0.388)	-1.176*** (0.394)	-1.090*** (0.386)
FMI	3.926 (3.823)				33.69*** (10.41)				23.77** (11.58)			
FMD		6.382 (5.227)				26.79*** (9.350)				19.18** (9.471)		
FME			1.553 (1.846)				11.92*** (4.117)				2.315 (6.276)	
FMA				-2.550 (4.603)				-0.917 (5.654)				21.98** (8.783)
Inflation	-0.0501 (0.113)	-0.0622 (0.112)	-0.0345 (0.108)	-0.0165 (0.107)	-0.500** (0.223)	-0.484** (0.231)	-0.367* (0.221)	-0.363 (0.233)	-0.263 (0.261)	-0.253 (0.245)	-0.170 (0.247)	-0.329 (0.266)
GDP Growth	-0.147** (0.0725)	-0.146** (0.0712)	-0.140* (0.0731)	-0.131* (0.0771)	-0.127 (0.177)	-0.0988 (0.180)	-0.0685 (0.178)	-0.0755 (0.176)	-1.079*** (0.177)	-1.060*** (0.173)	-1.044*** (0.175)	-1.142*** (0.180)
Economic Freedom Index	-0.412*** (0.145)	-0.389*** (0.134)	-0.412*** (0.147)	-0.395*** (0.133)	0.330 (0.272)	0.454 (0.284)	0.335 (0.272)	0.388 (0.277)	-0.570** (0.227)	-0.482** (0.224)	-0.541** (0.232)	-0.623*** (0.238)
F	6.717	6.580	6.660	6.444	2.251	2.114	2.094	1.584	14.41	15.31	14.06	13.63
r ²	0.261	0.269	0.258	0.257	0.0803	0.0680	0.0914	0.0693	0.370	0.374	0.364	0.389
N	327	327	327	327	327	327	327	327	327	327	327	327

I further replicate the model in lower and upper-middle income countries. Columns 1, 3 and 4 of Table 14 show the negative effects of financial market development on deposit funding. The coefficients are substantial and significant. This relationship becomes insignificant when employing the financial market depth index as the explanatory variable, as seen in column 2. The impact of the financial market development index is consistently negative for retail deposit proportion. The elasticity for retail deposit proportion is higher than for the deposit funding. This suggests that the development of financial markets in lower and upper-middle income economies accelerates economic growth (Friedrich et al., 2013), thereby increasing credit creation in the banking sector (Demirgüç-Kunt & Maksimovic, 1996). However, due to low income and limited access to the banking system for households, there is a little scope for banks to increase retail deposits. Thus, banks in lower income countries meet this credit demand through short-term borrowings and other sources of funding, causing a reduction in deposit funding and retail deposit proportion.

The relationship between time deposit proportion and financial markets development is inconclusive, except for the financial market depth index, which is statistically significant at 10 percent. Due to the lower significance level, I am cautious in forming an opinion on this finding. The negative relationship between financial markets and the banking system supports the argument of Korajczyk (1996), who reported the fragmentation of financial system in the emerging markets. This fragmentation causes the growth of financial markets at the cost of the banking system and vice-versa. Hence, these two systems, financial markets and banks compete with each other in lower and upper-middle income countries.

I further employ the dummy variables for high-income countries to find out if the high-income countries coefficients are significantly different. I find that the results are consistent with the main findings. The results are available upon request.

Table 14 Financial markets development: deposit funding and composition in lower and upper-middle income countries

The table reports coefficient and robust standard errors (in parentheses). Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportions as dependent variables. In all regression equations, I employ country fixed and year effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lag-level variable as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion report the results for 46 countries, whereas time deposit proportion presents the result for 44 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Deposit	Deposit	Deposit	Deposit	Retail	Retail	Retail	Retail	Time	Time	Time	Time
	Funding	Funding	Funding	Funding	Deposit	Deposit	Deposit	Deposit	Deposit	Deposit	Deposit	Deposit
					Proportion	Proportion	Proportion	Proportion	Proportion	Proportion	Proportion	Proportion
Interest Cost	0.155*** (0.0564)	0.148** (0.0610)	0.180*** (0.0535)	0.211*** (0.0607)	1.730*** (0.302)	1.584*** (0.282)	1.777*** (0.304)	1.896*** (0.340)	0.763 (0.515)	0.862 (0.550)	0.769 (0.520)	0.814 (0.542)
Equity Capital	-0.805*** (0.124)	-0.800*** (0.127)	-0.824*** (0.127)	-0.749*** (0.128)	-0.0524 (0.330)	-0.0589 (0.329)	-0.0325 (0.361)	0.132 (0.314)	0.0386 (0.462)	0.0615 (0.476)	0.000121 (0.463)	0.105 (0.449)
FMI	-20.13*** (7.104)				-49.90*** (17.24)				2.470 (17.80)			
FMD		-5.667 (4.324)				-42.48*** (12.46)				25.67* (15.32)		
FME			-9.949*** (3.477)				1.122 (7.470)				-11.88 (9.231)	
FMA				-22.97* (13.32)				-76.84*** (21.27)				-31.49 (22.85)
Inflation	-0.162*** (0.0340)	-0.164*** (0.0351)	-0.159*** (0.0352)	-0.166*** (0.0355)	-0.362*** (0.111)	-0.371*** (0.108)	-0.365*** (0.117)	-0.375*** (0.113)	-0.158 (0.222)	-0.144 (0.226)	-0.152 (0.222)	-0.164 (0.221)
GDP Growth	0.125* (0.0657)	0.108 (0.0692)	0.117* (0.0655)	0.0699 (0.0675)	-0.511** (0.223)	-0.465** (0.216)	-0.595*** (0.217)	-0.668*** (0.215)	-0.709*** (0.194)	-0.792*** (0.207)	-0.664*** (0.189)	-0.742*** (0.191)
Economic Freedom Index	-0.0477 (0.0698)	-0.00286 (0.0715)	-0.00996 (0.0731)	-0.0515 (0.0765)	-0.214 (0.256)	-0.224 (0.261)	-0.0323 (0.268)	-0.290 (0.263)	0.671** (0.312)	0.760** (0.308)	0.641** (0.311)	0.555* (0.326)
F	5.279	4.786	5.725	5.068	6.410	7.037	5.852	6.256	7.644	7.385	7.696	7.831
r ²	0.229	0.223	0.230	0.232	0.169	0.196	0.147	0.181	0.227	0.220	0.227	0.229
N	362	362	362	362	354	354	354	354	353	353	353	353

3.5.2 Relationship between financial market development and bank deposits: based on financial development level of the countries

The results in the previous section show that the banking system and financial markets co-evolve in high-income countries due to high financial integration. A financially integrated country has a developed financial system. To measure the impact of financial markets on the banking system in financially developed countries, the countries are divided into two subgroups based on their financial development, the high and the less financially developed economies. The average (mean) of the financial development index has been taken for all countries for the entire analysis period as a benchmark of financial development. The countries with a lower value for the financial development index than the benchmark are considered less financially developed and the remaining as high financially developed economies. These two subgroups have 43 and 45 countries respectively.

Table 15 shows the impact of financial market development on deposit funding and composition in high financially developed economies is broadly consistent with the findings for high-income countries³⁸. Columns (1-4) of Table 15 display insignificant coefficients for deposit funding, consistent with the findings for high-income countries. Columns 5 and 6 of Table 15 show the positive impact of the financial market index and financial market depth index on the retail deposit proportion. Other financial market indices present inconclusive relationships with retail deposit proportion. Columns 9, 10 and 12 of Table 15 show positive and statistically significant elasticities of the financial market indices for time deposit proportion. The impact of financial market indices on the time deposit proportion in highly financially developed economies is greater than for the high-income countries. This is because some countries such as Saudi Arabia, Qatar, and Argentina are high-income countries but less financially developed and integrated. This lowers the impact of financial market development

³⁸ There are about eight (8) high income countries which are classified as less financially developed and eleven (11) low income countries are classed into highly financially developed economies.

on the banking system in high-income countries.

The results report an inverse relationship between financial market development and deposit funding and retail deposit proportion in less financially developed economies. Columns 1, 3 and 4 of *Table 16* show coefficients -12.34 percent for financial market index, -6.05 percent for financial market efficiency index, and -19.46 percent for financial market access index. The elasticity of the financial market access index is greater than for the other two indices. This may be due to two reasons: first, access to financial markets allows households to shift their funds from bank deposits to financial markets, which decreases deposits. Second, an improvement in financial market access increases credit creation in the banking system (Demirgüç-Kunt & Levine, 1996; Duong et al., 2018), which is funded from other sources, thereby decreasing deposit funding. This negative relationship is consistent with retail deposit proportion (see columns 5, 6 and 8 of *Table 16*). However, the elasticity for retail deposit proportion is higher than for deposit funding. This shows that the financial markets and the banking system compete in less financially developed countries. The improvement of one system causes a deterioration in the other. This finding is consistent with findings for lower and upper middle-income countries. The literature also suggests that in fragmented and emerging markets, the banking system and financial markets compete (Song & Thakor, 2010). The relationships between time deposit proportion and financial market indices are not statistically significant.

Table 15 Financial markets development: deposit funding and composition in highly financial developed countries

The table reports coefficient and robust standard errors are in parentheses. Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportion as dependent variables. In all regression equations, I employ country fixed and year effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lagged level variables as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding, retail and time deposit proportions report the results for 45 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Deposit	Deposit	Deposit	Deposit	Retail	Retail	Retail	Retail	Time	Time	Time	Time
	Funding	Funding	Funding	Funding	Deposit	Deposit	Deposit	Deposit	Deposit	Deposit	Deposit	Deposit
					Proportion	Proportion	Proportion	Proportion	Proportion	Proportion	Proportion	Proportion
Interest Cost	0.349	0.383	0.380	0.378	-1.171*	-1.346**	-1.299**	-1.479**	1.932*	1.621	1.536	1.749*
	(0.250)	(0.245)	(0.250)	(0.237)	(0.658)	(0.634)	(0.626)	(0.631)	(1.054)	(1.000)	(1.076)	(1.016)
Equity Capital	-1.019***	-1.024***	-1.004***	-1.012***	0.318	0.394	0.229	0.218	0.371	0.426	0.229	0.354
	(0.166)	(0.175)	(0.166)	(0.159)	(0.292)	(0.283)	(0.284)	(0.274)	(0.551)	(0.542)	(0.533)	(0.531)
FMI	-3.816				23.25**				35.51**			
	(4.147)				(11.11)				(14.64)			
FMD		-3.169				26.77***				31.19***		
		(4.787)				(9.043)				(11.97)		
FME			-0.646				6.383				2.155	
			(1.755)				(4.446)				(7.385)	
FMA				-2.051				-1.215				28.81***
				(4.767)				(8.075)				(9.316)
Inflation	-0.444**	-0.447**	-0.462**	-0.441**	0.162	0.148	0.277	0.282	-0.0287	-0.00569	0.138	-0.155
	(0.209)	(0.208)	(0.204)	(0.202)	(0.449)	(0.436)	(0.427)	(0.460)	(0.445)	(0.424)	(0.432)	(0.446)
GDP Growth	-0.101	-0.0993	-0.115	-0.103	-0.446**	-0.492**	-0.362	-0.358	-1.455***	-1.479***	-1.330***	-1.493***
	(0.0927)	(0.0883)	(0.0908)	(0.0993)	(0.227)	(0.237)	(0.226)	(0.218)	(0.264)	(0.272)	(0.258)	(0.254)
Economic Freedom Index	-0.467***	-0.481***	-0.464***	-0.454***	0.565**	0.688**	0.549**	0.544**	-0.625**	-0.491*	-0.661**	-0.794***
	(0.159)	(0.157)	(0.158)	(0.148)	(0.275)	(0.286)	(0.276)	(0.272)	(0.285)	(0.296)	(0.284)	(0.293)
F	9.789	9.568	9.906	9.360	1.399	1.773	1.608	1.513	7.609	7.884	7.764	7.819
r ²	0.319	0.316	0.318	0.316	0.0461	0.0404	0.0453	0.0454	0.242	0.254	0.262	0.281
N	350	350	350	350	350	358	358	358	350	350	350	350

Table 16 Financial markets development: deposit funding and composition in less financial developed countries

The table reports coefficient and robust standard errors (in parentheses). Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportions as dependent variables. In all regression equations, I employ country fixed and year effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lag-level variable as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion report the results for 43 countries, whereas time deposit proportion presents the result for 41 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Deposit Funding	(5) Retail Deposit Proportion	(6) Retail Deposit Proportion	(7) Retail Deposit Proportion	(8) Retail Deposit Proportion	(9) Time Deposit Proportion	(10) Time Deposit Proportion	(11) Time Deposit Proportion	(12) Time Deposit Proportion
Interest Cost	0.0866* (0.0500)	0.0799 (0.0491)	0.103* (0.0529)	0.0927* (0.0557)	0.861 (0.546)	0.753 (0.510)	0.892 (0.550)	0.877 (0.568)	0.908*** (0.323)	0.908*** (0.321)	0.924*** (0.326)	0.915*** (0.323)
Equity Capital	-0.531*** (0.106)	-0.538*** (0.113)	-0.555*** (0.114)	- 0.443*** (0.0958)	0.210 (0.370)	0.174 (0.366)	0.178 (0.414)	0.521 (0.320)	-0.734* (0.446)	-0.737 (0.450)	-0.762* (0.454)	-0.653 (0.445)
FMI	-12.34** (5.497)				-44.21*** (13.11)				-10.70 (11.41)			
FMD		-4.838 (3.948)				-47.52*** (11.30)				-2.219 (11.05)		
FME			-6.049** (2.907)				-3.834 (6.444)				-7.072 (7.078)	
FMA				-19.46* (10.46)				-67.26*** (25.48)				-16.79 (19.45)
Inflation	-0.116*** (0.0313)	-0.124*** (0.0316)	-0.114*** (0.0328)	-0.11*** (0.0321)	-0.270** (0.108)	-0.300*** (0.104)	-0.292** (0.114)	-0.265** (0.114)	-0.288 (0.197)	-0.295 (0.199)	-0.282 (0.198)	-0.285 (0.199)
GDP Growth	0.0219 (0.0565)	0.0213 (0.0582)	0.0186 (0.0570)	-0.0045 (0.0547)	-0.497** (0.196)	-0.444** (0.191)	-0.525*** (0.191)	-0.593*** (0.195)	-0.685*** (0.160)	-0.690*** (0.163)	-0.683*** (0.160)	-0.712*** (0.161)
Economic Freedom Index	0.00492 (0.0625)	0.0175 (0.0620)	0.0238 (0.0652)	-0.0390 (0.0667)	-0.169 (0.246)	-0.181 (0.255)	-0.0862 (0.249)	-0.330 (0.248)	0.994*** (0.281)	1.005*** (0.278)	1.016*** (0.282)	0.948*** (0.300)
F	3.729	3.426	3.924	4.464	2.733	2.943	1.279	1.432	11.48	10.47	10.87	10.19
r ²	0.154	0.149	0.155	0.184	0.142	0.163	0.0897	0.0925	0.292	0.292	0.291	0.293
N	339	339	339	339	331	331	331	331	330	330	330	330

3.5.3 Crisis effects

The analysis period covers the GFC period, which may impact on the analysis (Goldsmith-Pinkham & Yorulmazer, 2010; Kim, Batten, & Ryu, 2020; Shin, 2009). Therefore, I controlled for this, using dummy variable 1 for crisis period. The crisis years for the countries have been taken from the World Bank Database³⁹. Literature has reported that the crisis had more impact on high financially developed countries than on less financially developed economies. I run the regressions first in all countries, then into two subgroups: the higher and the less financially developed economies.

The results show a negative impact of the crisis on deposit funding and retail deposit proportion in all countries (see Appendix 9). The economic impact on retail deposit proportion is higher than for deposit funding. On the other hand, a positive relationship between time deposit proportion and crisis has been found. The risk aversion behaviour incentivizes households to withdraw their funds from risky investments in the crisis period and save in safe assets. The other main variables such as financial market indices show a negative effect on deposit funding and retail deposit proportion. Moreover, the results show a positive effect of financial market development on time deposit proportion. The results are consistent with the main findings.

The effects of crisis on deposit funding in the high financially developed economies and the less financially developed economies have been examined (see Appendix 10 and Appendix 11). Results show a negative effect of the crisis on deposit funding in highly financially developed economies, consistent with the literature. During the global financial crisis period liquidity in the financial system dried up. Hence, banks from developed economies

³⁹ The World Bank Database. Data exported from the datamarket.com (<https://datamarket.com/data/set/47dy/banking-crisis-dummy-1banking-crisis-Onone#!ds=47dy!73ca&display=line&s=9v4>).

were facing difficulties in attracting deposits. Results do not show a statistically significant relationship between deposit composition, retail and time deposit proportions and crisis. In less financially developed economies, I find a negative impact of the crisis on retail deposit proportion. The relationships between deposit funding, time deposit proportion and crisis period are inconclusive. Retail deposits are one of the main sources of funding in less financially developed economies. During the crisis period, households use their savings to smooth their consumption. Hence, the proportion of retail deposits declines during this period. The relationship between other main variables and deposit funding and compositions are consistent with the main findings.

3.5.4 Deposit insurance

The banking regulatory authority provides deposit insurance to protect and incentivize deposit holder to save their funds in deposit products (Congress, 2010; Demirgüç-Kunt, Kane, & Laeven, 2015). Most countries offer deposit insurance to their bank deposit holders. I use the insured deposits to GDP ratio of the country as a control variable. The data are collected from the database Demirgüç-Kunt et al. (2015), who have conducted a worldwide survey of deposit insurance in the years 2003, 2010 and 2013. I interpolate the data for the year 2005-10 and 2011-12. Due to absence of year 2014 data, I consider the year 2013 deposit to GDP ratio to carry forward to the year 2014. Out of 88 countries, 10 countries do not have data from year 2003; hence, these countries are dropped from the analysis.

The results show a positive impact of deposit insurance on deposit funding and time deposit proportion in all countries (see results in Appendix 12). Although the elasticity of deposit insurance for time deposit proportion is higher than for bank deposit funding, the economic significance is very low. A one percent increase in the ratio of deposit protection fund to GDP causing a 0.02 percent increase in time deposit proportion. Similar positive relationship between deposit funding, retail, time deposit proportion, and deposit insurance are

obtained in less financially developed economies (see Appendix 14). The elasticity of deposit insurance on bank deposit funding and retail deposit proportion is almost the same. On the other hand, deposit insurance shows a higher coefficient for time deposit proportion. This suggests that deposit insurance creates trust among households in the banking system. This encourages households to save their money for a longer duration in higher earning deposit products.

The results for the relationship between deposit funding, retail, time deposit proportions and deposit insurance for high financially developed economies are insignificant (see Appendix 13). I also find that the direction of relationship between deposit funding, retail; time deposit proportion and financial market indices are broadly consistent with the main findings in all three datasets.

3.6. Robustness tests

To examine the effects of financial market development based on region, I divide the dataset into three regions: Africa, America, and Asia (Claessens & Laeven, 2004; Hasan, Koetter, & Wedow, 2009; Liu, Molyneux, & Nguyen, 2012; Liu, Molyneux, & Wilson, 2013). However, due to limited number of observations of the American group, I drop this from this study. The Asian group has 49 countries including 28 European countries. The global financial integration in the Euro area is higher than the other countries. Hence, a separate study has been conducted for this region⁴⁰.

The African region consists 30 countries out of which seven are highly financially developed. Due to the mix of high and less financially developed economies, the relationship between deposit funding, time deposit proportion and financial markets development cannot

⁴⁰ The results are available upon request.

be determined. I find a negative elasticity for the financial market depth index for retail deposit proportion, consistent with the less financially developed economies finding.

The results for retail and time deposit proportions of the Asian group is consistent with the findings of high financially developed economies. The results show a negative impact of financial market development on deposit funding, whereas in high financially developed economies, the relationship is inconclusive. The Asian group consists of 49 countries out of which 15 are less financially developed economies, which may be the reason for the negative relationship between financial market development and deposit funding. I further run the regressions for the Euro area, which consist only of highly financially integrated countries. As per expectation, the positive relationship between deposit funding, retail deposit proportion and financially market development are observed. The results are substantial and statistically significant. However, the relationship between financial market developments on time deposit proportion is insignificant.

Apart from banking and macroeconomic factors, there are other factors such as political stability of the country, civil war, government effectiveness, regulatory quality, corruption, which influence a households' decision for savings and usage of the banking system. Kaufmann (2007) has prepared an index which covers the broad range of countries governance system such as voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control for corruption. I conduct a VIF analysis and find a multicollinearity in these variables. Hence, I employ them separately in the regression models.

I first report the findings of regulatory quality in all countries. The results show a negative relationship between regulatory quality and deposit funding. It is because of the higher impact of better regulation on banking assets, which causes a deterioration in the proportion of deposit funding. On the other hand, retail and time deposit proportions show positive and

statistically significant coefficients with regulatory quality. This finding is consistent in less financially developed countries. However, the coefficients for highly financially developed economies are not statistically significant. The results for financial market indices follow the same trend of main analysis in all three datasets, all countries, high and less financially developed economies.

I further controlled for government effectiveness, political stability, control for corruption, voice & accountability, and rule of law (Andrianova, Demetriades, & Shortland, 2008; Beltratti & Stulz, 2012; Doumpos, Hasan, & Pasiouras, 2017). The direction of the relationship between financial market indices and the dependent variables are broadly consistent in all three datasets, all countries, high and less financially developed economies. To save space, I do not report the results in the essay, but they are available upon request.

In addition to this, the 2SLS with Bartlett-Kernel and Newey-West bandwidth tests have also been employed to address heteroskedasticity and autocorrelation in all three datasets, all, high, and less financially developed economies. Finding an optimum lag for bandwidth is an issue. I applied quadratic spectral (QS) prewhitened method⁴¹ to identify the optimum level of lag proposed by Newey and West (1994). The results are broadly consistent with the main findings. The results are available upon request.

3.7. Conclusion

This study investigates how financial markets development affects deposit funding and composition, retail and time deposit proportions. To measure countries' financial markets development, I used the financial market index and its sub-indices. These indices not only cover the value creation (market capitalization to GDP), efficiency (stock turnover to GDP ratio), and liquidity (stock turnover to GDP ratio) but also the access to stock markets, and

⁴¹ The number of optimal lag = $\lceil [3(T/100)]^{2/5} \rceil$ (2)

domestic and international debt markets (Svirydzenka, 2016). The pattern is not similar across all financial market indices (including sub-indices), or the financial and economic development levels of the countries involved.

Financial market indices do not show an impact on deposit funding and time deposit proportion in all countries using 2SLS method. However, the panel fixed effects and the system GMM methods suggest a negative impact of financial markets on deposit funding. I conclude that the financial markets provide an alternative channel of investment for household savings in all countries. This relationship becomes stronger for the retail deposit proportion. The insignificant relationship between financial market indices and time deposit proportion, and negative relationship between retail deposit proportion and financial market index suggest that households shift their low yield deposits to financial markets for a greater return. This negative relationship becomes more economically and statistically significant in lower and upper middle-income and less financially developed economies. However, it turns positive in high income and the highly financially developed economies for retail and time deposit proportions. These results are robust even after controlling for various macroeconomic and political factors.

The general perception of academics is that the development of financial market brings forth competition within the banking system. The financial architecture literature suggest that most countries show competition between the banking system and financial markets (Berglof & Bolton, 2002). On the other hand, Chinn and Ito (2006) support the argument of a complementary relationship between the financial markets and the banking system. Similarly, Song and Thakor (2010) propose three relationship between banks and financial markets, competition, coevolution, and coexistence. They find coevolution and coexistence in a well-developed financial system and competition in fragmented and emerging economies. Their study is based on banks' lending perspective. This study evaluates the relationship between

these two systems viz. financial markets and banking system from banks' borrowing viewpoint. The findings support the argument of Song and Thakor (2010).

There are five clear suggestions from this study. First, a well-developed and financially integrated system provides an environment which supports financial markets and the banking system growing together. This will help banks in attracting retail deposits and especially time deposits, which are stable sources of funding. The increase in retail and time deposit proportions will assist banks in complying with the Basel-III liquidity norms. Second, the interest rate is a key determinant in attracting time depositors in both subgroups, high and less financially developed countries. This relationship is more prominent in high financially developed countries than in less financially developed countries, largely because of the greater access to other financial products, which makes investors in developed countries more sensitive to interest rates. Banks in developed countries should therefore use interest rates wisely.

Third, the negative relationship between deposit funding, retail, time deposit proportions and capital suggest that active depositors generally monitor banks. This also shows that when banks have less capital, they are more likely to have a high amount of time deposits in their funding to enhance their stability. This is against the hypothesis of the new Basel-III regulation, where banks are encouraged to increase their capital to improve banking system stability. Higher capital incentivizes banks to increase the proportion of checking accounts or other sources of funding, which may eventually decrease their stability. Thus, policymakers need to be cautious when using capital as a macro-prudential tool in stabilizing the banking system (Allen, Carletti, & Marquez, 2015; Arping, 2019). Fourth, deposit insurance helps increase deposit funding, retail and time deposit proportions in less financially developed economies. Regulators should therefore focus on providing deposit insurance. This will improve the trust level amongst deposit holders for the banking system that will enable banks to attract more bank deposits. Fifth, good governance and economic freedom increases credit

creation in the banking system. It also develops trust in the banking system in lower and upper middle-income and less financially developed economies, which causes increase in time deposit funding.

I used financial market indices constructed based on the stock, debt, domestic and international markets. A separate study of these variables on bank deposits will give an in-depth understanding about their relationship with bank deposits. There are other factors such as competition within the banking system, stability, ownership, income, and education, which affect deposit funding, retail and time deposit proportions. The study of these variables and their relationship with deposit funding, retail, and time deposit proportions will give a more holistic view of the determinants of bank deposits. The role of banking regulation on deposit funding and composition will be useful for regulators in making policy decisions.

4. Effects of competition on bank deposits

4.1. Introduction

Banks as financial intermediaries ensure the flow of funds from funders to borrowers. Banks source funds through a variety of channels to meet loan demand. Prior to deregulation, banks' main source of funding was retail deposits and they had abundant low-cost deposits, which is why their main job was to manage assets. The economic boom during 1960s increased the lending activity of banks, thus, banks started facing shortages of funds, in the United States (Sinkey, 1992). Then, the First City Bank of New York (more recently known as Citibank) introduced negotiable certificate of deposits (NCDs) in 1961 (OCC, n.d.). Soon, this instrument became one of the major sources of funding in the United States banking system, beginning the era of wholesale funding⁴². Many countries followed the United States banking system model and introduced this type of instrument into their banking systems (Buckle & Thompson, 1992; Murdeshwar, 1970; Tan, 2005).

Wholesale funding is short-term and market driven, making the banking system vulnerable, and became an important factor contributing to the global financial crisis (GFC) (Huang & Ratnovski, 2011; Koch et al., 2014). On the other hand, deposits are one of the most stable sources of funding (King, 2013). Hence, after the GFC, BCBS (2010b, 2014) proposed guidelines under Basel-III to improve the proportion of deposits by determining lower run-off factors for deposits for maintaining the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR). Moreover, certain types of time deposits⁴³ are not considered for calculation of LCR and NSFR respectively. This makes time deposits more attractive and

⁴² Primarily, the use of certificate of deposit started in the USA. However, due to the unique feature of transferability, banks from other countries such as Singapore, UK, and India also started using this instrument to fulfil their shortage of funds (Buckle & Thompson, 1992; Murdeshwar, 1970; Tan, 2005).

⁴³ The retail time deposit, which has residual maturity more than 30 days and one year and attracts penalty more than or equal to the interest amount on early withdrawals.

increases competition in the banking system. Thus, Basel-III norms not only focus on bank deposit funding⁴⁴ but also on bank deposit composition⁴⁵ (e.g. retail and time deposit proportion) for bank stability.

An understanding of the effects of deposit competition on bank deposit funding and composition will assist regulators in designing regulatory policies. This area is still under-explored in the banking literature. Therefore, the objective of this essay is to identify the impact of deposit competition and market structure on bank deposit funding and composition.

Market structure and competition have always been important areas of concern for banking policymakers. Regulators design policies and guidelines for the stability of the financial system. Matutes and Vives (1996) find a positive relationship between deposit competition and bank instability. Similarly, Craig and Dinger (2013) show that the banks with lower deposit market power opt for riskier funding strategies. On the other hand, Boyd and De Nicolo (2005) state that higher market concentration induces banks to take more risk, causing fragility and systemic risk. Literature has yet to reach a conclusion on the impact of bank competition and stability. Most regulators around the globe provide guidelines and regulations to strike a balance between the competition and the stability in the banking system.

There have been several studies on banking competition and concentration and their effects on factors such as stability, profitability, efficiency, and economic growth (Beck et al., 2013; Berger et al., 2009; Boyd & De Nicolo, 2005; Carletti & Hartmann, 2002; Craig & Dinger, 2013). These studies have also been carried-out in different settings such as country-specific (Shaffer, 1989; Zhao, Casu, & Ferrari, 2010), continent-specific (Olivero, Li, & Jeon,

⁴⁴ Bank deposit funding = (Total customer deposits + deposits from banks + Other deposits and short-term borrowings)/ Total Assets of Banks

⁴⁵ Bank deposit composition: Retail deposit Proportion= Total Customer deposits (Current + Savings + Term)/ Total deposits (Total customer deposits + deposits from banks + Other deposits and short-term borrowings);
Time deposit proportion= Customer term deposit/ Total customer deposits

2011), cross-country (De Bandt & Davis, 2000), and worldwide analyses (Vives, 2001). However, to the best of my knowledge, there has been limited research on the effects of deposit competition and market power on bank deposit funding and composition, which is the primary focus of this study.

To carry out this study, I have used panel data for 75 countries covering the period 2004-2014. The countries represent both developed and developing economies. The bank level data is obtained from the Bankscope database. Tools to measure market power and competition include the Lerner index, Herfindahl-Hirschman index, concentration ratio, and Boone indicators. The Lerner and Herfindahl-Hirschman (HHI) indexes are extensively used in the competition literature (Aghion et al., 2005; Berger et al., 2004; Bikker & Haaf, 2002; Spierdijka & Zaourasa, 2018). HHI is popular amongst regulators, due to its straightforward computation (Carbó, Humphrey, Maudos, & Molyneux, 2009; Rhoades, 1995). In this study, the methodology of Craig and Dinger (2013) have been followed, who argued that deposit pricing reflects a better picture of deposit competition intensity than other measures such as HHI, Boone indicator or Panzar-Rosse model. Due to the limited availability of deposit interest rates data, the interest cost on average interest-bearing liabilities has been employed as a proxy for deposit pricing and deposit competition. Interest cost on average retail deposits along with the interest cost on average interest-bearing liabilities have also been used on a smaller dataset. This assists in finding the difference between the impact of interest cost of retail deposit and interest cost of average interest-bearing liabilities on bank deposit funding and composition. Furthermore, HHI at deposit and loan levels have been employed as a control variable for banks' market structure.

The results show a negative relationship between bank deposit funding and deposit competition in all countries and less financially developed countries. The negative impact of deposit pricing on bank deposit funding implies that deposit competition encourages banks to

use riskier sources of funding such as subordinated borrowing, capital market funding, and loans from banks. Although deposit competition helps banks attract retail deposits in less financially developed economies, it encourages banks to use other sources of funding in high financially developed economies, causing a negative relationship between interest cost and the proportion of retail deposits. Similarly, once banks face competition in retail deposit pricing, they use other sources of funding to reduce costs. However, this contributes to further fragilities in the banking system. A positive impact of interest cost on time deposit proportion, irrespective of the countries' financial development, has been observed. This suggests that households are rate sensitive for time deposits, consistent with the literature (Bikker & Gerritsen, 2017; Streit, Lange, & Paul, 2016).

The concentration measures show a negative relationship with bank deposit funding and composition. This implies that higher concentration creates market power in the banking system; banks use their power to increase profitability by reducing high cost deposits. The results show a negative relationship between deposit funding, time deposit proportion and employee cost in high financially developed economies. This may be because of technology adoption, which makes the banking system more efficient and hence reduces employee costs relative to total assets. This finding is consistent with the literature on banks' adoption of online banking as a result of increasing labor costs (Corrocher, 2006). On the contrary, the results for high and less financially developed economies show positive relationship between employee costs and retail deposit proportion, suggesting that banks require more employees to manage their transaction accounts.

This study has several academic contributions and policy implications. It contributes to the literature on deposit competition by studying the effects of deposit competition on bank deposit funding and composition. This study also touches the financial development literature by examining two subgroups, high and less financially developed economies (Beck et al., 2010;

Delis et al., 2013; Levine, 1997; Song & Thakor, 2010). Moreover, the study fills a gap in banking market structure literature by investigating the effects of market concentration on bank deposit funding and composition. In the real financial world, this study will help banks use interest rates to assist them in achieving the Basel-III liquidity norms. Moreover, it will encourage bank regulators to form policies to maintain bank deposit composition supporting banking system stability. Finally, this study identifies synergies for banking system regulators and competition authorities in monitoring a country's banking market structure.

The essay is organized in the following manner. Section 4.2 discusses the existing literature on market concentration, importance of deposits, and other key variables. Section 4.3 explains the data collection and methodology, while section 4.4 and 4.5 discusses the empirical findings and policy implications. Section 4.6 discusses the results obtained including robustness testing. Finally, section 4.7 concludes with policy implications and discusses future research opportunities.

4.2. Literature review

This section discusses the importance of deposits and deposit competition for bank stability. I also present a review of literature on the market concentration and competition and their effects on bank stability and performance.

4.2.1 Prior research on deposits

One of the most important sources of funds for banks is household savings. Banks generally offer a variety of deposit products to depositors as per their needs (Hubbard & O'Brien, 2012b). However, due to competition from other financial institutions and within the banking system, attracting deposits has become difficult, which encourages banks to use wholesale funding (also known as other borrowings) such as repurchase agreements, NCDs, and interbank borrowings (Wilkins, Gardner, & Chapman, 2016). The use of wholesale funding

has made the banking system fragile (Craig & Dinger, 2013; Huang & Ratnovski, 2011). Hence, BCBS (2010a) introduced Basel-III norms with new liquidity management guidelines to encourage banks to attract more retail deposits, increasing competition within the banking system for deposits. For the Australian market, Deans and Stewart (2012) found that after the GFC, banks shifted their focus to time deposits from wholesale funding. The proportion of time deposits increased to 45 percent (2012) from 30 percent (2007).

The deregulation of interest rate ceilings allowed banks to offer varying interest rates to depositors. This variation in interest rates can make the deposit products of one bank appear more attractive than other banks' (Koch et al., 2014). Banks compete against each other through interest rates (Diamond & Rajan, 2012; Egan et al., 2017). Hellmann, Murdock, and Stiglitz (2000) suggested that due to stiff competition, banks offer higher deposit rate to depositors at the cost of the firm's financial stability. In addition to managing bank deposit composition, banks also manage the maturity profile of deposits to manage their assets and liabilities. Hence, they offer varying interest rates according to their funding requirements (Diamond & Dybvig, 1983; Holmes, 1972). Looking at the Belgian market, De Graeve, De Jonghe, and Vander Vennet (2007) found that stable banks offered lower interest rates, and time deposits were more interest rate sensitive than checking and saving deposits.

The market discipline literature argues that the depositors of a bank monitor its risks and charge a premium for risk or bearing the cost of monitoring and managing those risks (Flannery, 2001; Martinez Peria & Schmukler, 2001), allowing banks to choose between an interest rate premium or stability. A less stable bank may offer a premium on deposits to attract deposit holders. Craig and Dinger (2013) found a positive relationship between non-performing loans, volatility in stock price, and deposit rates. Similarly, Egan et al. (2017) argued that firms with higher probability of default offer higher interest rates. Hence, most studies revolve around the effects of competition on interest rates. Berger and Hannan (1989); Calem and

Carlino (1991) found that highly concentrated markets show lower interest rates than less concentrated markets. They reported that the contractual maturity deposit products such as certificates of deposit (CDs) were more competitive than other deposit products.

4.2.2 Market power

The history of competition policy in the banking industry dates back to 1960s (Dick & Hannan, 2010; Harnay & Scialom, 2016). This competition policy led to the deregulation of the industry by allowing banks to offer varying interest rates and services to the depositors and borrowers. This gained academics' interest in identifying the market structure and the concentration level in the banking industry and their impact on economic environment. The benefits of competition encouraged governments to monitor concentration and competition at the industry level. The central bank's role is contradictory: on one hand, the country's central bank monitors this concentration and establishes rules and regulations to promote competition (Beck et al., 2006; Boyd & De Nicolo, 2005; Schaeck, Cihak, & Wolfe, 2009). On the other hand, it shows its concern about high competition, which can make the banking system fragile and can cause systemic risk in the system (Beck et al., 2013; Brunnermeier, 2009; Leroy & Lucotte, 2017). On the contrary, recent literature suggest that although increase in the market power of banks increases their loan risk taking behavior, they still enjoy the stability by employing other risk management techniques such as increasing equity capital and smaller loan portfolio (Berger, Klapper, & Turk-Ariss, 2017).

Market concentration and market power have been studied in the light of the conduct and performance of banks in the economic environment (Bain, 2013). This approach further increased the scope of study to include other factors such as stability, efficiency, and the economy (Berger et al., 2004). After the GFC, most studies were around competition and bank stability. Some economists show that competition encourages risky behavior of banks, creating instability in the banking system (Berger et al., 2004; Chan, Greenbaum, & Thakor, 1986).

Other economists argue that competition induces banks to attain higher profit, with that higher profitability creating a cushion for banks (Pilloff & Rhoades, 2002). The effects of market power and concentration also vary with geography and institutional setup (Hsieh & Lee, 2010). A bank with higher market power is likely to have higher capital, which decreases the probability of default and makes it more stable (Jiménez, Lopez, & Saurina, 2013; Keeley, 1990).

Despite the vast literature on market concentration and market power, there is scarce research on the deposit competition. This paper focuses on the effect of the competition on deposit funding and composition and implementation of Basel-III norms (LCR and NSFR) makes this study crucial in current economic environment.

4.2.3 Research questions

To examine the relationship between bank deposit funding, composition and deposit competition, the following research questions and hypotheses are formulated.

1. How does deposit competition affect bank deposit funding and composition?

H1 : Higher competition for deposits increases bank deposits funding and composition⁴⁶.

2. How does market concentration of the banking system affect bank deposit funding and composition?

H2 : Higher market concentration decreases bank deposit funding and composition⁴⁷.

⁴⁶ Bank deposit composition consists the retail and time deposit proportion. Higher deposit composition means increase in retail and time deposit proportion and lower deposit composition means decrease in retail and time deposit proportions.

⁴⁷ Higher market concentration in the banking system makes the banks more stable. Therefore, their reliance on wholesale funding increases for two reasons: one, it becomes easier for them to access wholesale funding; and two, wholesale funding is generally lower cost. This increases the profitability of banks.

4.3. Data collection

Bank-level financial statement data is collected from the Bankscope database for 193 countries covering period from 2004 to 2014. In most countries, data was not available for the entire period. Therefore, this study limits to banks with at least 9 years data from year 2004 to 2014 and covering more than 50 percent of market share of total deposits of the country. This exercise brings down the sample from 193 to 90 countries. Further, banks which do not have employee expenses data are dropped. I am careful about maintaining the 50 percent market share while dropping banks, if market share drops below 50 percent of a country; I drop countries from the dataset than the banks. Due to the unavailability of inflation data for Argentina and Georgia, these two countries are also dropped from analysis, leaving me with 75 countries (see Appendix 16). Table 17 and Table 18 show the number of countries and number of banks as per income and regional classifications.

Table 17 Income and regional distribution of countries

Regions	High income	Lower middle income	Upper middle income	Grand Total
East Asia & Pacific	4	3	2	9
Europe & Central Asia	27	1	9	37
North America, Latin America & Caribbean	2	2	3	7
Middle East & North Africa	7	1	1	9
Sub-Saharan Africa		9	4	13
Grand Total	40	16	19	75

Table 18 Income and regional distribution of number of banks

Regions	High income	Lower middle income	Upper middle income	Grand Total
East Asia & Pacific	43	95	24	162
Europe & Central Asia	561	8	489	1058
North America, Latin America & Caribbean	224	12	22	258
Middle East & North Africa	40	10	10	60
Sub-Saharan Africa		53	25	78
Grand Total	868	178	570	1616

Three dependent variables, bank deposit funding, retail, and time deposit proportions have been used. Bank deposit funding is measured as the deposits and short-term funding to total assets ratio. Retail deposit proportion is measured as customer deposits to total deposits and short-term funding, while time deposit proportion is measured as the proportion of customer time deposits to total customer deposits. Bank-specific data such as balances in transaction and non-transaction accounts, employee expenditures, capital, interest cost of funding, interest cost of retail deposits, and total assets of banks are obtained from the Bankscope database. There are several reasons for using Bankscope. First, it has a comprehensive database of banks' financial statements. Second, it provides the data such as customer deposits, bank deposits, and other funding in a standard format. Third, the database adjusts for the differences in accounting policies between countries. Gross domestic products (GDP) and inflation data are collected from the World Bank database. The political stability index, voice and accountability, rules of law, government effectiveness, control for corruption and regulatory quality index are collected from the Global Economy database.

4.3.1 Control variables

Early research suggested that the higher the competition for deposits, the more unstable the banking system (Berger et al., 2009; Smith, 1984). In general, depositors monitor the banks' stability and take actions such as withdrawal of funds from unstable banks and switch their bank accounts to stable banks (Diamond & Rajan, 2001; Iyer, Puri, & Ryan, 2012). There are various tools to measure bank stability such as Z-score, loan loss provision, and equity capital ratio. I use equity capital to total assets as a proxy for bank stability in my regression models.

Banks need employees to provide services to their deposit holders and borrowers. Poor service is one of the primary reasons for losing customers. The number of employees in banks can be a good proxy for the services of banks. However, due to limited data availability for the

number of employees, employee cost to total assets ratio has been used as a control variable for bank services.

To control for the cost of living and its impact on household expenditure and savings decisions, consumer price inflation (CPI) index has been used in the regression model. According to Demirguc-Kunt and Klapper (2012) on financial inclusion, household income is one of the highest cited reasons for households being unbanked. Therefore, I include log value of per capita income as a control variable. Craig and Dinger (2013) argue that older people like to save into bank deposits, therefore, the proportion of older population (65 years and above) has been used as a control variable. It is generally observed that countries' regulators and government interfere in the financial system, which affects the performance of the banking system. This interference varies as per social, economic, and financial development level of the country. Therefore, to control the variability in financial freedom, the financial freedom index developed by Heritage and Wall Street (2009) has been employed (Fu et al., 2014).

4.3.2 Econometric methodology

The effects of market structure on bank deposit funding, retail and time deposit proportions have been examined using firm level data. The econometric model is based on panel data and has the general form:

$$\begin{aligned} & \textit{Deposit Funding}_i \\ & = f(\textit{Interest}_i, \textit{Market Structure}_c, \textit{Bank Specific Variables}_i, \textit{Macroeconomic Variables}_c) \dots (4.1) \end{aligned}$$

$$\begin{aligned} & \textit{Retail Deposit Proportion}_i \\ & = f(\textit{Interest}_i, \textit{Market Structure}_c, \textit{Bank Specific Variables}_i, \textit{Macroeconomic Variables}_c) \dots (4.2) \end{aligned}$$

$$\begin{aligned} & \textit{Time Deposit Proportion}_i \\ & = f(\textit{Interest}_i, \textit{Market Structure}_c, \textit{Bank Specific Variables}_i, \textit{Macroeconomic Variables}_c) \dots (4.3) \end{aligned}$$

Where interest denotes interest expenses on average interest-bearing liabilities and market structure is the concentration of markets measured by Herfindahl-Hirschman Index (HHI) at deposit and loan levels. The subscripts “*i*” and “*c*” indicate bank and country level variables respectively.

An increase in bank deposits allows banks to decrease interest rates on deposits, leading to a reverse causality between bank deposits and interest rates. The higher bank deposits are, the higher is market concentration. Moreover, higher bank deposits increase total assets, incentivizing banks to increase their loans and advances and employees to manage those assets. Hence, a reverse causality between interest cost, market concentration, equity capital, employees’ expenditure, and bank deposits are expected. To address the issue of reverse causality between equity capital, employees’ cost, market size and bank deposits, the lagged level of the independent variables have been used as explanatory variables (Khan et al., 2017). One of the main issues with endogeneity in the dataset is identifying a suitable instrument which directly affect the endogenous variables but not the dependent variables. Craig and Dinger (2013) use wholesale banking rate as an instrument for the deposit rate. However, due to the limited availability of wholesale rate data, the lagged value of endogenous variables (interest cost of average of interest-bearing liabilities, interest cost of retail deposits, and market concentrations) have been used as instruments. Using a lagged variable of endogenous variable is advisable, if a proper exogenous instrument is not available (Bellemare et al., 2017; Reed, 2015).

Table 19 contains the definition of dependent, explanatory, and control variables with the sign of expected relationship with the dependent variables.

Table 19 Literature survey

Variables' Name	Abbreviation	Measure	Expectation	Literature
Dependent Variable				
Deposit Funding	DF	Total Deposit to Total Assets		
Retail Deposit Proportion	RDP	Customer deposit to Total bank deposit		
Time Deposit Proportion	TDP	Customer time deposit to total customers' deposit		
Explanatory Variables				
Bank Specific factors				
Interest costs to average interest-bearing liabilities	IC	Interest expenses/ Average Interest-bearing liabilities	Positive	Craig and Dinger (2013); Egan et al. (2017); Hutchison (1995)
Interest cost to retail deposits	ICR	Interest expenses of customer deposits /Average of customer deposits	Positive	Craig and Dinger (2013); Egan et al. (2017); Hutchison (1995)
Employee Cost	STA	Salary expenses/Total Assets	Positive	Berry (2000); Dick (2007); Keaveney (1995); O'Cass and Grace (2004); Bikker & Haaf, 2002); Bourke (1989)
Stability of Firm	CAP	Shareholders' fund/ Total Assets	Positive	Berger et al. (2009)
Market Size	MS	Log value of total assets	Positive	Craig and Dinger (2013)
Industry Specific Factors				
Herfindahl-Hirschman Index (Deposit)	HHID3	A country level indicator- concentration of top three banks of each country based on total deposits.	Positive	Craig and Dinger (2013); Corvoisier and Gropp (2002)
Herfindahl-Hirschman Index (Loan)	HHIL3	A country level indicator- concentration of top three banks of each country based on total loans.	Positive	Berger et al. (2009); Corvoisier and Gropp (2002)
Macroeconomic factors				
Income	LINCOME	Log value of GDP per capita income	Positive	Barth et al. (2013)
Inflation	Inflation	Country level consumer price inflation	Positive	Bourke (1989) Barth et al. (2013)

Variables' Name	Abbreviation	Measure	Expectation	Literature
Old Population	OP	Age beyond 65 years and above	Positive	Craig and Dinger (2013)
Financial Freedom Index	FFI	The index measures the financial freedom and state interference in financial system.	Negative	Chortareas et al. (2013); Heritage and Wall Street (2009)

I follow the method of Craig and Dinger (2013) who employ interest rates to measure deposit competition. They use money market deposit accounts (MMDA) interest rates as a proxy for the deposit rate. However, finding interest rates according to the availability of deposit products is difficult in a cross-country study, I therefore employ interest expenses over average interest-bearing liabilities as a proxy for deposit rates. Further, interest on retail deposits is also used to identify the sensitivity of households' saving behavior with respect to retail deposit rates. However, due to limited data availability of interest on retail deposits, I carry out this analysis with a smaller dataset, which includes 40 countries.

The Herfindahl-Hirschman index (HHI) measured at deposits and loan levels have been used to investigate the impact of market structure on bank deposits. HHI3 is measured at a national level and is a frequently-used tool for measuring the degree of concentration (Berger et al., 2004; Berger et al., 2009; Craig & Dinger, 2013). The HHI is calculated as sum of squared market share (in percentage) of the firms. The HHID3 and HHIL3 are calculated using following models 4 and 5.

$$HHID3 = \sum_{i=1}^n B_i^2 \dots \dots \dots (4.4)$$

$$HHIL3 = \sum_{i=1}^n B_k^2 \dots \dots \dots (4.5)$$

Where, B_i stands for market share (total deposits) of the banks, B_k is the market share of loans, and $n= n$ number of banks between 1 and 3 in the banking system are included for the calculation of HHI.

In high financially developed economies, competition within the banking system will have higher impact than in less financially developed economies. To divide the full dataset into two subgroups, the average (mean value) of financial development index of selected countries has been taken for the analysis period. Countries with a lower financial development index than the benchmark⁴⁸ are considered less financially developed and remaining are high financially developed economies. The descriptive statistics for the full and subgroup datasets are available in Table 20.

Table 20 Descriptive statistics

Variables Name	No. of Observations	Means	Standard Deviations	Min.	Max.
All Countries					
Deposit Funding Retail Deposit Proportion	14,547	70.36	19.58	0.03	99.46
Time Deposit Proportion	14,464	68.64	30.06	0.00	100.00
Interest Cost to interest bearing liabilities	13,409	65.37	31.93	0.00	100.00
Interest cost to retail deposits	14,547	3.50	2.70	-0.16	57.26
Employee Costs	11,206	16.06	42.48	-0.21	722.64
Equity Capital	14,547	1.94	1.69	0.00	21.22
Market Size	14,547	13.98	11.81	-76.24	99.72
HHID3	14,547	13.91	2.78	4.39	21.81
HHIL3	14,547	1,281.09	1,120.77	254.16	6,828.13
CPI	14,547	1,248.75	1,050.65	265.57	6,732.65
Old Population	14,547	4.98	3.98	-7.98	43.59
Per Capita income	14,547	9.70	1.21	5.10	11.64
Financial Freedom	14,547	58.17	19.45	10.00	90.00
Regulatory Quality	14,547	12.99	4.58	1.03	21.58
	14,547	0.62	0.89	-1.54	2.06
Developed Countries					
Deposit Funding Retail Deposit Proportion	8,407	77.11	15.38	0.03	99.46
	8,339	78.36	24.18	0.00	100.00

⁴⁸ Average of financial development index of selected countries for our analysis period.

Variables Name	No. of Observations	Means	Standard Deviations	Min.	Max.
Time Deposit Proportion	7,458	53.97	30.12	0.00	100.00
Interest Cost to interest bearing liabilities	8,407	2.54	1.84	-0.16	24.80
Interest cost to retail deposits	5,472	3.15	6.15	-0.21	137.99
Employee Costs	8,407	1.23	0.98	0.00	14.89
Equity Capital	8,407	10.95	9.56	-0.52	98.69
Market Size	8,407	15.26	2.22	8.21	21.81
HHID3	8,407	1,617.71	1,184.90	338.45	6,828.13
HHIL3	8,407	1,537.80	1,128.59	318.89	6,732.65
CPI	8,407	2.58	1.82	-0.95	10.58
Old Population	8,407	10.31	1.04	6.57	11.64
Per Capita income	8,407	70.61	14.48	30.00	90.00
Financial Freedom	8,407	14.37	4.28	2.08	21.58
Regulatory Quality	8,407	1.25	0.58	-0.91	2.06
Developing Countries					
Deposit Funding	6,140	61.12	20.89	0.13	96.93
Retail Deposit Proportion	6,125	55.40	32.15	0.00	100.00
Time Deposit Proportion	5,951	79.66	28.19	0.00	100.00
Interest Cost to interest bearing liabilities	6,140	4.82	3.09	0.00	57.26
Interest cost to retail deposits	5,734	28.38	56.39	0.00	722.64
Employee Costs	6,140	2.90	1.95	0.01	21.22
Equity Capital	6,140	18.12	13.26	-76.24	99.72
Market Size	6,140	12.06	2.37	4.39	18.70
HHID3	6,140	820.18	828.39	254.16	6,216.44
HHIL3	6,140	852.98	774.86	265.57	5,013.56
CPI	6,140	8.28	3.76	-7.98	43.59
Old Population	6,140	8.85	0.87	5.10	11.35
Per Capita income	6,140	41.14	10.37	10.00	90.00
Financial Freedom	6,140	11.10	4.30	1.03	19.30
Regulatory Quality	6,140	-0.24	0.36	-1.54	1.16

Table 20 shows that most of the data (variables) for less financially developed countries show higher variability than for the highly financially developed countries. The standard deviations for deposit funding, retail and time deposit proportions for more highly financially developed economies are 15, 24 and 30 respectively, whereas the developing countries dataset shows 21, 32, and 28 percent standard deviations for the same variables. This indicates that

time deposits in developing countries are less volatile than in highly financially developed countries. On the other hand, interest costs and concentration indices such HHID3 and HHIL3 show higher standard deviation in developed countries than the developing countries. This variation also reflects the effect of GFC in the developed countries, which did not have much effect in developing countries (Lane & Milesi-Ferretti, 2011). To smooth the data and filling missing values, I apply a three years moving average (Crane & Crotty, 1967; McCulloch & Baulch, 2000; Raudys et al., 2013; Syntetos & Boylan, 2005). The analysis is also conducted without using the moving average and results are broadly consistent⁴⁹. The Breusch-Pagan/Cook-Weisberg homoscedasticity test has also conducted for the dataset. These results reject the null hypothesis in the favour of heteroscedasticity. The Hausman test results are in favour of fixed effect methods.

Deposits consist of the sum of net deposits⁵⁰ plus interest on deposits for that period. Hence, I expect a dynamic characteristic in the dataset. The autocorrelation (serial correlation) test confirms this. The system GMM method has been used to address heteroscedasticity, autocorrelation, and endogeneity issues. Arellano and Bond (1991) proposed a two-step difference GMM model. The first step assumes that error terms in the dataset are independent and homoscedastic. The second step uses the residuals obtained from the first step to determine the variance and co-variance matrix, which makes the two-step GMM estimator asymptotically more efficient. However, this model was criticized by Blundell and Bond (2000) due to the large finite sample bias when the time-period was small and proposed system GMM, which allows additional instruments and provides efficient estimates. The two-step system GMM estimation technique has been employed for robustness testing.

⁴⁹ The results are available upon request.

⁵⁰ Net deposits= Opening deposits + Deposit inflow – Deposit outflow

Generally system GMM has certain limitations such as usage of weak instruments and over-identification of instrumental variables. Bun and Windmeijer (2010) suggested using the testing procedures for weak instruments such as Lagrange multiplier test (Kleibergen, 2005) and Conditional Likelihood Ratio test suggested by Moreira (2003). Roodman (2018) suggested using the robust function in the two-step GMM model works as a Windmeijer (2005) correction. Hence, I use a two-step GMM model with the robust function. Moreover, Hansen-J test is used to detect the over-identification issues of instrumental variables.

The following model for all countries and other subgroups has been used. The three dependent variables, bank deposit funding, retail, and time deposit proportion are used.

$$\Pi_{cbt} = \beta_0 + \phi_b + \varphi_c + \beta_1 \Pi_{cbt-1} + \sum_{g=1}^G \beta_g X_{bct}^g + \sum_{e=1}^E \beta_e X_{bct}^e + \varepsilon_{cbt} \dots \dots (4.6)$$

Where Π_{cbt} are the dependent variables: deposit funding, retail, and time deposit proportions of bank “b” at time “t” and of country “c”. Π_{cbt-1} is previous year’s value of dependent variables. ϕ_b - consists the Bank’s fixed effects; φ_c -country fixed effects. X_{bct}^g are the vector of the bank specific factors such as interest cost, employee cost, and financial stability of the firm (capital to asset ratio). X_{bct}^e indicates the macroeconomic factors and market concentration indexes for each country. ε - denotes disturbance or error term.

4.4. Preliminary analysis

The impact of deposit competition, market structure have been investigated on bank deposit funding, retail, and time deposit proportions through panel fixed effects method in the all countries dataset (as shown in Table 21). The results show a negative relationship between bank deposit funding and interest cost. The coefficients are around -0.82, which suggest that for a 1 percent increase in interest costs, the proportion of deposit funding decreases by 0.8 percent. The negative relationship indicates that as interest cost increases, banks increase other

sources of funding such as subordinated debt and treasury bills, which are generally short-term in nature and carry a lower cost. This causes a reduction in the proportion of deposit funding. On the other hand, an increase in interest rates incentivizes retail depositors to place their funds in banks. As expected, interest rates show a positive impact on retail and time deposits proportions. Retail deposits include customers' transaction account deposits. The transaction accounts deposits are less rate sensitive, therefore, retail deposit proportion shows less elasticity than time deposit proportion.

Table 21 Bank deposit competition and banking market structure: banking deposit funding and composition for all countries.

The table reports coefficient and robust standard errors (in parentheses). Columns (1-3) present the result for bank deposit funding, whereas columns (4-9) show the results for bank deposit composition using retail deposit to total deposit and retail deposit to total retail deposit as dependent variables. In all regression equations, I employ firm fixed and year effects. The deposit funding and retail deposit proportion report the results for 75 countries, whereas time deposit proportion presents the result for 73 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Deposit Funding	Deposit Funding	Deposit Funding	Retail Deposit Proportion	Retail Deposit Proportion	Retail Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion
Interest cost	-0.793*** (0.142)	-0.830*** (0.141)	-0.816*** (0.140)	0.644*** (0.184)	0.624*** (0.184)	0.635*** (0.184)	2.101*** (0.287)	2.033*** (0.289)	2.086*** (0.289)
HHID3		-0.00284*** (0.000393)			-0.00149** (0.000674)			-0.00200* (0.00105)	
HHIL3			-0.00366*** (0.000490)			-0.00148* (0.000766)			-0.000549 (0.00114)
Employee Cost _{t-1}	-0.215 (0.251)	-0.214 (0.247)	-0.203 (0.246)	0.479 (0.352)	0.481 (0.354)	0.485 (0.354)	-1.412 (0.997)	-1.402 (0.991)	-1.410 (0.996)
Equity Capita _{t-1}	-0.566*** (0.0395)	-0.559*** (0.0392)	-0.559*** (0.0391)	-0.129*** (0.0489)	-0.126** (0.0488)	-0.126*** (0.0489)	-0.339*** (0.0829)	-0.331*** (0.0838)	-0.337*** (0.0836)
Market Size _{t-1}	0.364 (0.792)	0.376 (0.788)	0.392 (0.786)	-2.165** (0.900)	-2.157** (0.903)	-2.152** (0.902)	0.264 (1.257)	0.248 (1.263)	0.275 (1.258)
CPI	0.137*** (0.0519)	0.0338 (0.0499)	0.0110 (0.0512)	-0.00536 (0.122)	-0.0594 (0.121)	-0.0562 (0.119)	-0.0724 (0.123)	-0.110 (0.120)	-0.0864 (0.124)
GDP per capita	-4.493*** (1.201)	-6.589*** (1.190)	-6.309*** (1.217)	-0.357 (1.774)	-1.467 (1.771)	-1.103 (1.762)	0.840 (2.707)	-1.145 (2.785)	0.403 (2.755)
Financial Freedom	-0.0132 (0.0232)	-0.000328 (0.0227)	0.00465 (0.0228)	-0.0684* (0.0352)	-0.0618* (0.0349)	-0.0612* (0.0348)	0.0384 (0.0475)	0.0584 (0.0486)	0.0429 (0.0485)
Population Old	3.527*** (0.415)	2.656*** (0.410)	2.931*** (0.410)	1.939*** (0.570)	1.479** (0.588)	1.696*** (0.579)	3.602*** (1.004)	3.536*** (1.000)	3.643*** (1.018)
Constant	199.3*** (8.867)	204.6*** (8.727)	204.8*** (8.806)	117.6*** (11.17)	119.9*** (11.18)	119.8*** (11.13)	69.78*** (18.73)	81.45*** (19.77)	68.26*** (19.52)
F	46.42	47.23	47.13	12.07	11.38	11.34	15.48	15.14	14.67
r ²	0.247	0.258	0.259	0.0347	0.0368	0.0361	0.119	0.121	0.119
N	12929	12929	12929	12858	12858	12858	8632	8632	8632

I further investigate the effects of market concentration using HHID3 and HHIL3 on bank deposit funding, retail, and time deposit proportions. The results show a negative relationship between bank deposit funding, retail, time deposit proportions, and market concentration (HHID3) measured at deposit level. The elasticity for bank deposit funding is higher than for retail deposit proportion. However, the economic significance is low for both dependent variables, bank deposit funding and retail deposit proportion. Market concentration (HHIL3) shows negative relationships with deposit funding and retail deposit proportion. I do not find a statistically significant relationship between market concentration and time deposit proportion.

Employee cost has been used as a control variable on the basis that banks will need more employees to manage a large number of deposit account holders. I do not find an impact of employee costs on bank deposit funding, retail, and time deposit proportions. On the other hand, the results show capital is a crucial factor in determining bank deposit funding, retail, and time deposit proportions. Among the macroeconomic variables, inflation exhibits positive effects on bank deposit funding, but these results turn insignificant when market concentration is used as a control variable. No other dependent variables show a significant relationship with inflation. Hence, it can be inferred that the relationship between inflation and bank deposits is insignificant.

There is also no significant relationship between the financial freedom index and bank deposits funding and time deposit proportions. The retail deposit proportion shows a negative relationship with financial freedom index. This relationship is statistically significant at 10 percent. Thus, I am cautious in making inferences from this result. Per capita income exhibits a negative relationship with the bank deposit funding. I cannot determine the relationship between retail, time deposit proportions, and income.

4.5. Main findings

Table 22 shows the results of 2SLS using bank deposit funding, retail, and time deposit proportions as dependent variables in all countries. Columns (1-9) have independent variables interest costs and employee costs as main variables to measure the impact of deposit competition and aggressiveness of banks on the dependent variables. Furthermore, concentration indexes measured at deposits (HHID3) and loans (HHIL3) levels have also been used for detecting the effects of market structure on bank deposits, as shown in columns 2, 3, 5, 6, 8, and 9. The other bank and economy related variables such as market size, consumer price inflation, per capita income, financial freedom index, and per capita income are used as control variables. To address the issue of time invariant factors, I include year effects in the model.

The first column of Table 22 shows a negative impact of interest cost on bank deposit funding. The coefficient of interest cost is -0.683 and is statistically significant at the 1 percent level. This relationship is consistent using market structures viz. HHID3 and HHIL3 as control variables. In fact, the coefficients decreased to -0.739 and -0.752 and statistically significant at 1 percent level, as shown in columns 2 and 3 respectively, and the economic significance is also substantial. A one percent increase in interest cost causes a 0.74 percent decrease in the proportion of bank deposits to total assets. This negative relationship shows that when banks face increase in interest costs, they opt for a lower cost of funds, leading to a reduction in the proportion of bank deposit funding. This is consistent with the findings in the literature that argues that an increase in retail deposit rates incentivizes banks to use wholesale funding to smooth their costs (Feldman & Schmidt, 2001; Huang & Ratnovski, 2011). Similarly Craig and Dinger (2013) report that increases in retail deposit rates cause banks to fund riskier products to compensate for their cost. On the other hand, the results show the same riskier behaviour of banks from the banks' borrowing perspective.

Columns (4-6) and (7-9) of Table 22 show a positive impact of interest costs on retail and time deposit proportions. The results show a higher impact of interest cost on time deposit proportion than for retail deposit proportion. As per columns 4 and 7 of Table 22, a one percent increase in interest rates increases retail and time deposit proportions by 0.61 and 2.39 percent respectively. A positive relationship between retail, time deposits, and interest rates are consistent with the general understanding and literature (De Graeve et al., 2007). This relationship is also consistent with the panel fixed effects findings. Although interest cost comprises the interest on both short-term borrowings and retail deposits including transaction and non-transaction deposits, I consider it to be a proxy for retail deposit interest rates and cost of funding. Although a study regarding the impact of interest rates on deposits requires deposit interest rates according to deposit products, due to limited data availability, I leave this avenue for future research.

Table 22 Bank deposit competition and banking market structure: banking deposit funding and composition for all countries.

The table reports coefficient and robust standard errors (in parentheses). Columns (1-3) present the result for bank deposit funding, whereas columns (4-9) show the results for bank deposit composition using retail deposit to total deposit and retail deposit to total retail deposit as dependent variables. In all regression equations, I employ firm fixed and year effects. I use interest cost, HHID3 and HHIL3 as endogenous variable and their lag-level variable as instrument variables. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion report the results for 75 countries, whereas time deposit proportion presents the result for 73 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Deposit Funding	Deposit Funding	Deposit Funding	Retail Deposit Proportion	Retail Deposit Proportion	Retail Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion
Interest Cost	-0.683*** (0.119)	-0.739*** (0.122)	-0.752*** (0.124)	0.611*** (0.142)	0.588*** (0.141)	0.584*** (0.140)	2.390*** (0.244)	2.321*** (0.246)	2.378*** (0.249)
HHID3		-0.0027*** (0.000261)			-0.0011*** (0.000404)			-0.00161** (0.000760)	
HHIL3			-0.0039*** (0.000333)			-0.0015*** (0.000487)			-0.000308 (0.000857)
Employee Cost $t-1$	-0.228 (0.154)	-0.224 (0.152)	-0.210 (0.151)	0.483** (0.206)	0.485** (0.206)	0.490** (0.207)	-1.397** (0.586)	-1.390** (0.584)	-1.395** (0.586)
Equity Capital $t-1$	-0.564*** (0.0262)	-0.558*** (0.0260)	-0.558*** (0.0259)	-0.129*** (0.0284)	-0.127*** (0.0284)	-0.127*** (0.0284)	-0.332*** (0.0560)	-0.326*** (0.0566)	-0.331*** (0.0564)
Market Size $t-1$	0.297 (0.472)	0.321 (0.469)	0.354 (0.468)	-2.146*** (0.567)	-2.135*** (0.567)	-2.123*** (0.567)	0.115 (0.834)	0.110 (0.838)	0.123 (0.836)
CPI	0.131*** (0.0322)	0.0334 (0.0325)	0.000260 (0.0344)	-0.00354 (0.0634)	-0.0439 (0.0642)	-0.0536 (0.0645)	-0.0948 (0.0793)	-0.123 (0.0791)	-0.102 (0.0812)
GDP per capita	-4.55*** (0.743)	-6.549*** (0.766)	-6.449*** (0.774)	-0.339 (1.042)	-1.174 (1.061)	-1.079 (1.054)	0.746 (1.628)	-0.842 (1.772)	0.503 (1.742)
Financial Freedom	-0.0157 (0.0138)	-0.00292 (0.0137)	0.00419 (0.0137)	-0.0676*** (0.0208)	-0.0624*** (0.0208)	-0.0599*** (0.0208)	0.0314 (0.0277)	0.0479 (0.0293)	0.0340 (0.0293)
Population Old	3.596*** (0.241)	2.750*** (0.246)	2.938*** (0.239)	1.918*** (0.326)	1.564*** (0.343)	1.662*** (0.332)	3.659*** (0.589)	3.603*** (0.588)	3.681*** (0.595)
F	105.8	105.8	107.4	15.51	15.03	14.98	34.52	34.76	33.59
r ²	0.247	0.258	0.259	0.0346	0.0367	0.0360	0.118	0.120	0.119
N	12929	12929	12929	12858	12858	12858	8627	8627	8627

Turning to market structure variables and their impact on bank deposits, columns (2-3) show a negative relationship between market concentration and bank deposit funding. The HHID3 shows a coefficient of -0.0027, whereas HHIL3 shows -0.0039, both statistically significant at the 1 percent level. Similarly, the results show a negative relationship of these variables with retail deposit proportion. However, the elasticity for retail deposit proportion is lower than for bank deposit funding. The coefficients are -0.001 and -0.0015 for HHID3 and HHIL3 respectively using retail deposit proportion as dependent variable. Further, results show a negative relationship between HHID3 and time deposit proportion. I do not find a statistically significant relationship between HHIL3 and time deposit proportion. The higher market concentration decreases competition within the banking system. Therefore, banks feel stable in the less competitive environment, which encourages them to increase low-cost funding to increase profitability. This finding is consistent with the literature, with a positive relationship between market concentration and bank stability (Jiménez et al., 2013; Keeley, 1990). Moreover, the results show a higher impact of market concentration on bank deposit funding than for retail deposit proportion. This finding is consistent with the literature, which suggests that retail deposits are less sensitive than wholesale funding (King, 2013). Moreover, the results also show a higher elasticity for market concentration measured at loan level than for bank deposits for both the dependent variables viz. bank deposit funding and retail deposit proportion. This suggests that higher concentration in the loan market gives a higher feeling for stability to banks than the concentration measured at the deposit level.

Employee cost has been used as another variable to study the effects of banks' aggressiveness on bank deposit funding, retail, and time deposit proportions. The results do not show a statistically significant relationship between bank deposit funding and employee costs. On the other hand, employee cost (as shown in columns 4-6) show a positive impact on retail deposit proportion and a negative effect on time deposit proportion (as shown in columns 7-9). The retail deposit proportion consists transaction

accounts including demand deposits, checking account, and saving account. The frequency of the transactions in these accounts are relatively more than the time deposits. Hence, to provide services to transaction accounts, banks require higher number of employees. On the other hand, the frequency of transactions for time deposits is less, meaning that fewer employees are required to manage these accounts. This negative relationship is also because of technological improvements in the banking system, which improve employees' performance. Hence, banks need relatively fewer employees to manage the business and require fewer branches. This finding and arguments are aligned with the literature. Hernández-Murillo, Llobet, and Fuentes (2010) argue that online bank adoption is helpful in achieving cost efficiency and acquiring customer deposits. Similar findings are reported by Goh and Kauffman (2013) who found that the online banking implementation increases deposits by 29.3 percent in the United States banking system. They further reported a negative relationship between number of employees and total deposits. Controlling for the usage of online banking system will give more insights in the research. However, I leave this area for future research.

The effects of bank stability on bank deposit funding, retail, and time deposit proportions. According to columns (1-3) of Table 22, equity capital and bank deposit funding show a negative relationship. Column 1 shows a coefficient of -0.56 at a 1 percent significance level, suggesting that a 1 percent increase in equity capital reduces bank deposits by 0.56 percent relative to total assets. Similarly, I find a negative relationship between retail, time deposit proportions and equity capital. Results suggest that time deposit proportion is more elastic than retail deposit proportion. This negative relationship for bank deposit funding and time deposit proportion with bank stability obtained through 2SLS is consistent with panel fixed effect findings. This leads me to conclude that stable banks prefer low-cost deposits, which creates a moral hazard issue. This finding is consistent with the argument of Arping (2019), who states that increase in capital requirement crowds out deposits. Thus, it raises questions on

the Basel capital adequacy norms, which hypothesize that increasing banks' capital makes banking systems more stable.

To control for the market size of the firm, log of total assets has been used as a control variable. The results do not show a statistically significant relationship between deposit funding, time deposit proportion, and market size. On the other hand, market size shows a negative relationship with retail deposit proportion. The elasticity of market size is in the range -2.15 to -2.12 percent. This indicates that as lending demand increases, banks use other sources of funds such as deposits from banks, other deposits, other short-term funding, causing a decrease in the retail deposit proportion.

As to other macroeconomic control variables, column 1 shows a positive impact of consumer price inflation (CPI) index on bank deposit funding. However, I do not find a significant relationship with other dependent variables. Since, no other regression results show a significant relationship, I am cautious to make any inference from the positive result. The GDP per-capita has been used to control for countries' income level. The results show a negative relationship between bank deposit funding and per capita income. Columns (1-3) exhibit elasticity in the range of -4.55 to -6.55 percent for bank deposit funding. The relationship between retail, time deposit proportions and per capita income cannot be determined. The negative coefficients and higher elasticity for bank deposit funding support the argument that as economic activity increases in countries banks fulfil their funding requirement with less use of retail deposits and bank deposits, which causes reduction in bank deposit funding (Sinkey, 1992).

The financial freedom index has been employed to control for the effects of government intervention in the financial system. The financial freedom index includes effectiveness of government regulations, degree of state intervention, development of financial markets, and openness to foreign competition among others. The financial freedom provides opportunities to bankers and householders in using different sources of funding and investment instruments, which may cause a reduction in bank

deposits. As per expectation, a negative relationship between the financial freedom index and retail deposit proportion has been observed. On the other hand, I do not find any impact of financial freedom on deposit funding and time deposit proportion. Columns (4-6) show elasticity around -0.06, which suggests that a one (1) point increase in financial freedom decreases retail deposit proportion by 0.06 percent.

Recent research shows a significant impact of the older population in using the banking system (Acharya & Mora, 2012; Craig & Dinger, 2013). Hence, the proportion of older population is used as an instrumental variable in the regression model. Columns (1-9) show a positive elasticity for older population with bank deposit funding and composition. Column (7-9) exhibits a higher elasticity for older population on time deposit proportion than the retail deposit proportion. The positive relationship between deposits and older population is consistent with the general understanding that older people like to save in safe assets.

The effects of deposit competition on bank deposit funding and composition have also been examined using the two-step system GMM method. The results show a negative impact of interest cost on bank deposit funding, consistent with the main findings (2SLS). Retail and time deposit proportions do not show a significant elasticity for interest cost. On the other hand, a positive relationship between retail, time deposit proportions, and market structure is found, which is contrary to the main findings. However, I am cautious in interpreting this result due to the over-identification issue. Since two-step system GMM shows over identification, I employ 2SLS for further analysis, which does not have over- or under-identification issues. The results of system GMM are available upon request.

4.5.1 Financial development level of the country

A further investigation of the impact of deposit competition on bank deposit funding, retail and time deposit proportions in high and less financially developed economies has been conducted, as earlier research has shown the variability in households' and banks behaviour in using the financial

system according to the country's financial development level (Boot & Thakor, 1997; Song & Thakor, 2010).

As shown in Table 23, interest cost does not show a significant relationship with bank deposit funding in highly financially developed economies. The results show a negative elasticity between interest cost and retail deposit proportion, contrary to the main findings. On the other hand, time deposit proportion presents a positive elasticity for interest cost, consistent with the main findings (see columns (7-9) of Table 23). The negative relationship between retail deposit proportion and interest cost suggests that as interest cost increases banks use low cost deposits such as deposits from banks, money market instruments and other deposits that decreases the proportion of retail deposits. On the contrary, an increase in interest rates encourages households to save more by using time deposits. This helps them in earning higher yields and eventually increases the time deposit proportion. On the other hand, Table 24 shows a negative impact of interest cost on bank deposit funding, but positive effects on retail and time deposit proportions in less financially developed economies, which is consistent with the main findings. Hence, the negative relationship in less developed economies and positive relationship in high financially developed economies suggest that the main results for interest cost are driven by less financially developed economies.

Table 23 Bank deposit competition and banking market structure: Banking deposit funding and composition for high financially developed economies

The table reports coefficient and robust standard errors (in parentheses). Columns (1-3) present the result for bank deposit funding, whereas columns (4-9) show the results for bank deposit composition using retail deposit to total deposit and retail deposit to total retail deposit as dependent variables. In all regression equations, I employ firm fixed and year effects. I use interest cost, HHID3 and HHIL3 as endogenous variable and their lag-level variable as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding, retail deposit proportion, and time deposit proportion for 43 countries and the dataset consists 935 number of banks. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Deposit Funding	Deposit Funding	Deposit Funding	Retail Deposit Proportion	Retail Deposit Proportion	Retail Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion
Interest cost	-0.166 (0.151)	-0.162 (0.151)	-0.169 (0.151)	-0.902*** (0.238)	-0.922*** (0.236)	-0.890*** (0.236)	2.626*** (0.322)	2.594*** (0.322)	2.628*** (0.322)
HHID3		0.000428 (0.00031)			-0.00229** (0.000484)			-0.0026*** (0.000875)	
HHIL3			0.000731 (0.000469)			-0.0028*** (0.000710)			-0.000571 (0.00116)
Employee cost $t-1$	-1.569*** (0.313)	-1.595*** (0.316)	-1.586*** (0.315)	0.945** (0.478)	1.080** (0.476)	1.008** (0.474)	-1.846*** (0.687)	-1.846*** (0.683)	-1.851*** (0.686)
Equity Capital $t-1$	-0.693*** (0.0394)	-0.696*** (0.0395)	-0.696*** (0.0395)	-0.0662 (0.0648)	-0.0550 (0.0644)	-0.0575 (0.0646)	-0.409*** (0.0742)	-0.395*** (0.0755)	-0.406*** (0.0747)
Market size $t-1$	-0.163 (0.579)	-0.196 (0.580)	-0.203 (0.579)	-3.333*** (0.941)	-3.159*** (0.937)	-3.182*** (0.939)	-0.340 (0.971)	-0.211 (0.987)	-0.314 (0.978)
CPI	-0.256*** (0.0825)	-0.269*** (0.0837)	-0.269*** (0.0830)	-0.0960 (0.128)	-0.0236 (0.129)	-0.0420 (0.128)	0.0570 (0.191)	0.0975 (0.192)	0.0674 (0.192)
GDP per capita	-0.0372 (0.919)	0.684 (1.088)	0.875 (1.117)	3.460** (1.501)	-0.415 (1.652)	-0.0386 (1.707)	-3.801* (2.243)	-7.562*** (2.650)	-4.481* (2.704)
Financial Freedom	-0.053*** (0.0146)	-0.0567*** (0.0145)	-0.0568*** (0.0145)	-0.0144 (0.0246)	0.00403 (0.0246)	-0.000865 (0.0247)	0.0544* (0.0328)	0.0768** (0.0338)	0.0570* (0.0335)
Population Old	0.0479 (0.305)	0.139 (0.314)	0.0922 (0.307)	1.463*** (0.473)	0.970** (0.480)	1.292*** (0.476)	0.753 (0.687)	0.412 (0.697)	0.748 (0.688)
F	51.18	47.76	47.96	16.34	16.48	15.97	26.78	26.81	25.48
r ²	0.236	0.236	0.236	0.0539	0.0609	0.0574	0.109	0.112	0.109
N	7472	7472	7472	7414	7414	7414	6632	6632	6632

Table 23 shows a negative relationship between retail deposit proportion and market concentrations measured by both deposit and loan level in highly financially developed economies. Moreover, HHIL3 shows a higher sensitivity than HHID3. As with the panel fixed effect results, time deposit proportion shows a negative relationship with HHID3. I do not find a statistically significant relationship between time deposit proportion and HHIL3. Similarly, columns (1-3) do not show significant impact of market concentration on bank deposit funding in high financially developed economies.

Unlike high financially developed economies, Table 24 shows the negative impact of market concentration on bank deposit funding in less financially developed economies. Although columns (8-9) of Table 24 show negative impact of market concentration on time deposit proportion, I do not find a significant result for retail deposit proportion, as shown in columns (4-6). Hence, I find that the impact of market concentration on bank deposits is negative irrespective of countries' financial development level. This suggests that higher market concentration creates a moral hazard issue for banks, incentivizing banks to attract low-cost deposits and low-cost sources of funds, contributing to banking system instability.

One of the interesting findings is that employee cost shows a negative impact on bank deposit funding and time deposit proportion in high financially developed countries (see columns 1-3 and 7-9 of Table 23). The coefficients for deposit funding and time deposit proportion are around -1.6 and -1.85 respectively. On the other hand, the relationship between employee cost and retail deposit proportion is positive (see columns 4-6 of Table 23). The relationship between bank deposit funding, time deposit proportion and employees' cost are insignificant in less financially developed economies (see columns 1-3 and 7-9 of Table 24). Like highly financially developed economies results, less financially developed economies banks' results show positive relationship between employee costs and retail deposit proportion. The contradictory relationship for time deposit proportion (negative) and for retail deposit proportion (positive) shows the high number of employees helps banks provide better services to their

transaction account holders, causing an increase in the retail deposit proportion. The increase of transactions accounts holders and their deposits is higher than the time deposit increase, which causes a decrease in the time deposit proportion.

Table 24 Bank deposit competition and banking market structure: Banking deposit funding and composition for less financially developed economies

The table reports coefficient and robust standard errors (in parentheses). Columns (1-3) present the result for bank deposit funding, whereas columns (4-9) show the results for bank deposit composition using retail deposit to total deposit and time deposit to total retail deposit as dependent variables. In all regression equations, I employ firm fixed and year effects. I use interest cost, HHID3 and HHIL3 as endogenous variable and their lag-level variable as instrument variables. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion report the results for 32 countries and whereas time deposit proportion presents the result for 30 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Deposit Funding	Deposit Funding	Deposit Funding	Retail Deposit Proportion	Retail Deposit Proportion	Retail Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion
Interest Cost	-0.750*** (0.172)	-0.828*** (0.180)	-0.822*** (0.183)	1.126*** (0.260)	1.140*** (0.262)	1.126*** (0.261)	2.553*** (0.351)	2.439*** (0.353)	2.433*** (0.351)
HHID3		-0.00777*** (0.000560)			0.00135 (0.000881)			-0.00392** (0.00194)	
HHIL3			-0.00703*** (0.000547)			0.0000491 (0.000819)			-0.00360** (0.00151)
Employee Cost _{t-1}	-0.0122 (0.180)	-0.104 (0.179)	-0.0498 (0.178)	0.577** (0.228)	0.593*** (0.228)	0.577** (0.228)	-0.128 (1.141)	-0.161 (1.139)	-0.0972 (1.143)
Capital _{t-1}	-0.508*** (0.0329)	-0.498*** (0.0325)	-0.499*** (0.0323)	-0.156*** (0.0312)	-0.158*** (0.0312)	-0.156*** (0.0312)	-0.167** (0.0764)	-0.159** (0.0760)	-0.156** (0.0760)
Market Size _{t-1}	0.447 (0.672)	0.199 (0.668)	0.314 (0.658)	-0.837 (0.696)	-0.794 (0.698)	-0.836 (0.697)	3.079* (1.684)	2.719 (1.685)	3.057* (1.670)
CPI	0.151*** (0.0364)	-0.140*** (0.0388)	-0.115*** (0.0422)	-0.0140 (0.0784)	0.0366 (0.0830)	-0.0121 (0.0816)	-0.172* (0.0940)	-0.250** (0.0986)	-0.278*** (0.103)
GDP per capita	-7.248*** (1.198)	-5.159*** (1.173)	-4.951*** (1.220)	3.770** (1.503)	3.418** (1.531)	3.754** (1.553)	17.28*** (3.076)	16.42*** (3.048)	16.49*** (3.065)
Financial Freedom	0.0715* (0.0367)	0.0777** (0.0344)	0.110*** (0.0356)	-0.0391 (0.0479)	-0.0402 (0.0480)	-0.0394 (0.0479)	-0.160** (0.0722)	-0.0972 (0.0790)	-0.0975 (0.0794)
Population Old	7.333*** (0.592)	5.323*** (0.579)	6.069*** (0.596)	4.897*** (0.700)	5.248*** (0.747)	4.906*** (0.725)	6.892*** (1.333)	7.955*** (1.366)	7.828*** (1.372)
F	87.10	95.39	94.18	8.257	7.779	7.712	13.80	14.22	14.47
r ²	0.301	0.337	0.329	0.0624	0.0625	0.0624	0.191	0.199	0.198
N	5457	5457	5457	5444	5444	5444	1995	1995	1995

Bank stability shows a negative relationship between bank deposit funding and time deposit proportion in both subgroups, high and less financially developed economies, consistent with the main results. Columns (1-3 and 7-9) of Table 23 show a negative impact of equity capital on deposit funding and retail deposit proportion. However, I do not find a statistically significant relationship between equity capital and retail deposit proportion in high financially developed economies. Table 24 columns (1-9) exhibits a negative impact of bank stability on deposit funding, retail, and time deposit proportions in less-financially developed economies. I infer that bank stability creates moral hazard in the banking system, consistent with the literature (Agoraki, Delis, & Pasiouras, 2011; Arping, 2019; Hellmann et al., 2000).

Lastly, log of total assets has been used as a control variable in the regression model to control for the impact of market size of the firm. The results show a negative impact of market size on retail deposit proportion in highly financially developed economies, as shown in columns 4-6 of *Table 23*. The results do not show a significant relationship between bank deposit funding, time deposit proportion and market size in highly financially developed economies. On the other hand, Columns (7 and 9) of *Table 24* show a positive impact of market size on bank deposit funding. However, the results are significant at 10 percent. Hence, I do not infer this relationship. No other dependent variables show significant elasticity for market size in less financially developed economies (see *Table 24*). The results of highly financially developed economies are consistent with the main results for all countries.

There are several macroeconomic factors that influence bank deposit funding and households' saving decisions. One is consumer price inflation; I employ this as a control variable in both high and less financially developed economies. The results show a significant negative relationship between inflation and bank deposits funding in highly financially developed economies. No other dependent variables show a significant relationship with inflation in highly financially developed economies (see *Table 23*). On the other hand, inflation shows a negative relationship with time deposit proportion in less financially developed economies, as shown in *Table 24*. Further, I find contradictory results for

deposit funding in less financially developed economies. Column 1 of Table 24 shows a positive relationship between deposit funding and inflation. This relationship turns negative when I employ market concentration as a control variable (see columns 2 and 3 of Table 24). Thus, I cannot make any inference from this result. However, the columns (7-8) of Table 24 show a negative impact of inflation on time deposit proportion, which suggests that high inflation increases the households' cost of living, causing decrease in savings in less-financially developed economies.

The results show a negative relationship between income and time deposit proportion in highly financially developed economies. I do not find significant relationship between deposit funding, retail deposit proportion and countries' income level, except for retail deposit proportion in one regression as shown in column 4 of Table 23. However, this relationship turns insignificant when I use market concentration as control variable. Hence, the relationship between retail deposit proportion and per capita income cannot be determined in high financially developed economies. In less financially developed economies, the results show negative coefficients of income variable for deposit funding (see columns 1-3 of Table 24). This finding is consistent with the literature (Patrick, 1966). Huang and Ratnovski (2011) reported that as economic activity increases, it increases the credit demand in the country and to fulfil this credit demand, banks generally use wholesale funding, decreasing bank deposit funding. This relationship turns positive for retail and time deposit proportions (see columns 4-9 of Table 24). This relationship implies that due to limited alternative investment instruments, households use deposit products such as transaction and non-transaction deposits to save surplus money as income grows.

Furthermore, like the main regression model, I employ financial freedom index as a control variable in the regression models for high and less financially developed economies. Columns (1-3) of Table 23 show a negative impact of financial freedom on bank deposit funding in high financially developed economies. This relationship turns positive for time deposit proportion as shown in columns (7-9) of Table 23. This negative relationship between financial freedom and bank deposit funding

implies that financial freedom increases either economic activity in the country, increases banking assets or increases the alternative sources of funding for banks, causing a decrease in bank deposit funding. Moreover, it also increases household trust in the banking system, incentivizing households to use time deposit products to save money for longer periods. Unlike highly financially developed economies, financial freedom shows a positive impact on bank deposit funding in less financially developed economies. Financial freedom does not show a significant impact on retail deposit proportion. I find a negative relationship between the financial freedom index and time deposit proportion. However, this relationship turns insignificant when using market concentrations as control variables (see columns 7-9 of Table 24). Therefore, I am cautious in drawing inferences from this result. The positive relationship between bank deposit funding and the financial freedom index in less financially developed economies suggests that banks attract more deposits and other short-term borrowing, increasing bank deposit funding.

Finally, the proportion of older population has been used as a control variable in both subgroups. Columns (4-6) of Table 23 show a positive relationship between older population and retail deposit proportion in high financially developed economies. No other dependent variables show significant relationship with older population in high financially developed economies. On the other hand, Table 24 presents a positive elasticity for bank deposit funding, retail and time deposit proportion with the older population (see columns 1-9 of Table 24). The results show a higher sensitivity for time deposit than the bank deposit funding and retail deposits proportion. This implies that in less financially developed economies, due to fewer investment opportunities, households prefer saving their money in time deposits in banks.

The other control variables such as political stability, regulatory quality, government effectiveness, and rule of law have been applied. The relationship among the main explanatory variables and dependent variables are broadly consistent with the main findings. The results are available upon request.

4.6. Robustness tests

I further employ interest on customer deposits to measure the impact of retail deposit interest rates on bank deposits funding, retail and time deposit proportions. I hypothesize that the interest cost on retail deposits and interest cost on total deposit will cause multicollinearity in the regression model. To check this hypothesis, a VIF analysis test has been conducted, but results do not show multicollinearity. This allows me to use both the variables in the model. However, due to limited data availability for interest cost of customer deposits, I drop countries whose data was not available for the entire period. This brings the dataset down to 40 countries.

The results show a consistent significant negative relationship between bank deposit funding and interest cost on total deposits in the all countries dataset⁵¹. Like the main results (Table 22), the retail and time deposit proportions exhibit a positive relationship with interest cost on deposits. Interest cost on retail deposits shows a negative relationship with bank deposit funding, consistent with the findings of interest cost on total deposits. However, I find a negative impact of interest cost of retail deposits on retail deposit proportion, contrary to the finding for total deposits. This suggest as interest rates on retail and time deposit increase, banks increase other sources of funds, that eventually decreases the proportion of retail and time deposits (see results in Appendix 17). I do not find a significant relationship between interest cost on retail deposits and time deposit proportion.

Both market concentrations viz. HHID3 and HHIL3 show a negative impact on deposit funding. Like the main results, HHIL3 exhibits higher elasticity than HHID3. The market concentrations (HHID3 and HHIL3) do not show a significant relationship with retail and time deposit proportions, whereas in the main results for all countries, the results show a negative impact of market concentrations on retail deposit proportion. Another important variable, employee cost, shows a negative relationship with bank deposit funding in one regression using HHID3 as a control variable. However, the coefficient is

⁵¹ All countries- The all countries dataset.

significant at 10 percent and no other results show a significant relationship with bank deposit funding. Hence, I am cautious to interpret this result. Moreover, a significant positive relationship between employee costs and retail deposit proportion has been found, consistent with the main results for all countries. The relationship between time deposit proportion and employee costs is insignificant, which was negative in the main findings. The other control variables financial freedom index, per capita income, CPI, and older population show broadly consistent results.

I replicate the model in two subgroups, the high (see Appendix 18) and less financially developed economies (see Appendix 19). The results do not show a significant relationship between bank deposit funding, retail deposit proportion and interest cost to total deposit in highly financially developed economies. However, time deposit proportion has a positive relationship with interest cost to total deposits, consistent with the main finding. Interest on retail deposits shows a negative relationship with retail deposit proportion. On the other hand, it exhibits positive impact on bank deposit funding (see Appendix 18). This contrary relationship suggests that as interest on retail deposits increases, banks increase other low-cost sources of funding, which eventually increases bank deposit funding but decreases the retail deposit proportion. In the main regression analysis for high financially developed economies, interest cost on total deposit shows a negative impact on retail deposit proportion. However, when I use interest cost on total and retail deposits, interest cost on total deposit becomes insignificant and interest cost on retail deposit shows negative elasticity. This suggests that the negative elasticity of interest cost on total deposit for retail deposit proportion in the main analysis is driven by interest cost on retail deposit proportion. Hence, it can be inferred that the interest cost on retail deposit and retail deposit proportion have negative relationship. On the other hand, time deposit proportion does not show a significant relationship with interest cost on retail deposit.

Market concentrations show a positive relationship with bank deposit funding in high financially developed economies. No other dependent variables show a significant relationship with market concentrations. On the other hand, in the main results for high financially developed economies, I find

a negative relationship between market concentration and retail deposit proportion, but not with other dependent variables. Furthermore, employee cost shows a positive elasticity for retail deposit proportion, consistent with the main results for high financially developed economies. The relationship between bank deposit funding, time deposit proportion, and employee cost are insignificant, which were negative in the main results for highly financially developed economies.

The other control variables show broadly similar findings except for the financial freedom index. The financial freedom index shows a negative relationship with bank deposit funding and time deposit proportion. On the other hand, the main results show a positive relationship between financial freedom index and time deposit proportion. Due to the contradictory results, I am cautious in making any inference from this finding (see results in Appendix 18).

The less financially developed economies show a negative elasticity of interest cost on total deposit for bank deposit funding. Retail and time deposit proportions show a positive relationship with interest cost to total deposits, consistent with the main findings. However, like all countries and highly financially developed economies, less financially developed economies show a negative effect of interest on retail deposit on deposit funding and retail deposit proportion. Interestingly, interest cost to total deposit shows a positive relationship with retail deposit proportion, whereas interest cost to retail deposit shows a negative relationship, which is counter intuitive. The results suggest that an increase in interest rates on retail deposit incentivizes banks to increase the proportion of other deposits such as deposits from banks and non-retail deposits. This reduces the retail deposit proportion in the banks' liabilities management. At the same time, when there is an increase in interest cost to total deposits, banks choose retail deposits over other deposits to increase their stability.

The less financially developed economies show a negative impact of market concentration on deposit funding. This is consistent with the main findings. Unlike the main results, the results do not show a significant relationship between HHID3 and time deposit proportion. Moreover, like main results

for less financially developed economies, I do not find a statistically significant relationship between market concentration and retail deposit proportion.

The other important variable, employee cost, exhibits a positive effect on retail deposit proportions in all countries, as shown in columns (4-6) of Appendix 17. The economic significance is substantial. Similarly, the results for highly financially developed economies are significant for retail deposit proportion but not for other dependent variables (see Appendix 18). On the other hand, less financially developed economies show positive relationship between retail, time deposit proportions and employee cost. Results show a one percent increase in the proportion of employee cost to total assets increases the proportion of retail deposit by 0.7 percent and time deposit to total deposit by 4 percent (see Appendix 19). I do not find a significant impact of employee cost on bank deposit funding, except in one regression, as shown in column 2 of Appendix 19. However, this coefficient is statistically significant at 10 percent, and I am cautious in making inferences from this result. The positive elasticity of employee cost for retail and time deposit proportion supports the argument of lacking in technological improvement in less financially developed economies. Thus, it requires high number of employees to provide services to depositors. Another reason for such a relationship is state ownership of banks in less financially developed economies, which discourages the reduction of employees in the banking system. However, I cannot delve into the relationship between bank ownership and bank deposits, which can be an interesting study for future research. The other control variables results are broadly consistent with the main results of less-financially developed economies.

4.6.1 Additional Analysis

I further hypothesize that higher market concentration with higher interest rates will have a positive impact on bank deposit funding and compositions, due to high market power and the high brand image. To examine this hypothesis, I have used the interaction term between HHID, HHIL, and interest costs. Contrary to main findings, the results show a positive relationship between interaction of market

concentrations (HHID and HHIL) and interest cost and bank deposit funding and time deposit proportions (see Appendix 20). However, the results for retail deposit proportions of interaction terms are consistent with the main findings. This contradictory findings for retail deposit proportion and bank deposit funding suggest that in a highly concentrated market, banks increase the other sources of funding such as short-term, interbank borrowings, and bank deposits to reduce the cost of funding, arises due to high interest rates. The other results are broadly consistent with the main findings.

4.7. Conclusion and policy implications

To the best of my knowledge, this study is the first studying the impact of deposit competition on deposit funding and composition. I show how deposit competition and market structure affects banks' behaviour in attracting deposits especially retail deposits, and time deposits. This behaviour has also been investigated as per financial development level of the countries.

The results suggest that an increase in interest cost to total deposit incentivizes banks to decrease their deposit funding to other sources of funding. However, this relationship varies according to deposit products. Retail and time deposits proportions are positively affected by the increase in interest cost to deposits in all countries. This relationship also varies according to countries' financial development. In high financially developed economies, the increase of interest cost causes a reduction in retail deposit proportion. This suggests that as interest cost increases banks from highly financially developed economies increase funding from other sources, reducing the proportion of retail deposits. On the other hand, time deposit proportion shows a positive relationship with interest irrespective of countries' financial development level, which is consistent with the literature.

I further employ interest on retail deposits to measure the impact on bank deposits. The results show that interest on retail deposits negatively affects deposit funding and retail deposit proportion in all and the less financially developed economies. This suggest that as interest on retail deposits increases banks choose cost-effective sources of funding that causes a reduction in bank deposit funding and retail

deposit proportion in all and the less financially developed economies. Interestingly, in highly financially developed economies, on one hand, the interest cost of retail deposit shows a negative effect on retail deposit proportion; on the other hand, it shows a positive effect on bank deposits funding. This indicates that an increase in retail deposit rates encourage banks to use sources of funds other than customer deposits, causing a reduction in retail deposit proportion and increases in bank deposit funding.

Market structure shows a negative elasticity for bank deposit funding, retail, and time deposit proportions in all countries. Whereas, highly financially developed economies' results show negative impact on retail and time deposit proportions. Similarly, less financially developed economies' deposit funding and time deposit proportion are also negatively affected by market concentration. This negative relationship suggests moral hazard in the banking system. The higher is market concentration, the lower is deposit funding. Moreover, I find a negative impact of bank stability on deposit funding in all three datasets, suggesting a moral hazard issue.

There are various studies related to deposit competition, deposit pricing and bank stability (Arping, 2019; Schlueter, Sievers, & Hartmann-Wendels, 2015; Vazquez & Federico, 2015), banks' funding cost (Allen et al., 2015; Deans & Stewart, 2012; Li, Loutskina, & Strahan, 2019; Wilkins et al., 2016) and bank risk (Craig & Dinger, 2013), yet there is limited research on how deposit competition affects banks' funding composition. This paper contributes to banking and bank deposit literature by studying the impact of deposit competition and market structure on deposit funding and composition, retail and time deposit proportions. It also contributes to the financial development literature by conducting this study according to countries' financial development level.

Does this study have any policy implications? On one hand, banking regulatory authorities focus on the stability of the banking system, on the other hand, competition control authorities monitor competition in the banking system. Despite a large literature on banking competition and stability, the relationship is still inconclusive. However, the findings support the argument that deposit competition

creates moral hazard in the banking system, by encouraging them to obtain low cost sources of funding. Hence, this study promotes banking regulators and competition control authorities to work in collaboration to make the banking system stable by monitoring market structure. It will also assist banks in fulfilling the Basel-III guidelines related to Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR), which will make the banking system more robust.

Five clear suggestions come forward from this study: (i) while using interest rates as a tool to attract deposits, banks should be careful about their overall funding composition. (ii) this study suggests that in addition to NSFR, banking regulatory authority should make guidelines related to bank deposit funding and competition. (iii) Regulatory authorities should monitor market concentration in the banking system, as failing to do so creates a moral hazard issue in the banking system (iv) In less financially developed economies, banks can opt for technological advances, which will decrease banks' costs and improve profitability. (v) Regulatory authorities generally recommend increasing the equity capital for the stability of the banking. However, it should be used cautiously, since it encourages banks to opt for low cost funding strategies, which makes the banking system fragile.

Certainly, more research is needed in this area. A study that assesses the impact of different interest rates on deposit products will give better insight about the deposit funding and composition for the banks. The effect of deposit competition on bank deposit composition also varies according to the types of banks such as global and domestic banks, which can be an interesting study. Another important study can be identifying the relationship between bank deposit funding, composition and banking regulation.

5. Conclusions

In this thesis, three key questions have been investigated regarding the determinants of bank deposits, bank deposits funding and composition, retail and time deposit proportions in a cross-country set up. The first essay examines the role of human capital development on the usage of banking system in terms of bank deposits. The second essay aims to understand the role of financial markets development on bank deposits funding and composition. The third study focuses on the effects of deposit competition on bank deposits funding and composition. All three studies have been conducted in various settings such as in high and less financially developed economies and in high and lower and upper middle-income countries. Since, all three studies have been investigated in cross-country set up, several macroeconomic variables have been employed as control variables.

The studies are related to economic development literature including financial markets, human capital development, and economic growth. The financial inclusion⁵² literature suggests that income, education, and accessibility to financial institutions among others are key determinants that encourage households to use the formal financial system (Demirgüç-Kunt & Klapper, 2013). Income, education, and health are interrelated. For example, a high income allows households to have nutritious food and access to the healthcare system. Similarly, once a country's income grows, government can spend on development of the healthcare and the education systems. The better health facilities and education system contribute to economic growth, hence, these three factors create a virtuous circle and encourage households to use the formal financial system. Banks

⁵² Financial inclusion is defined as the use of formal financial system (Allen, Demirguc-Kunt, Klapper, & Peria, 2016).

being a first point of contact, households first open their bank account and start savings for various reasons such as retirement, bequest, and home. Thus, in the first essay, the role of healthcare system and education on bank deposits has been investigated. The results show that the government expenditure on healthcare system increases countries' bank deposits. However, the impact of healthcare system is greater in highly financially included countries than the less financially included. Moreover, findings suggest that the impact of the healthcare system on bank deposits will be more in high income countries and the countries with good governance. I find a positive impact of education on bank deposits in high income, bank driven, and highly financially included economies. This confirms the argument that to get the higher impact of education on bank deposits, better governance, income, and access to the financial system are needed.

Once the importance of human capital development for the growth of bank deposits has been established, one can investigate the impact of development of financial institutions on bank deposits. In this direction, the second essay focuses on the role of financial markets on bank deposits funding and composition. The general intuition is that development of the financial markets competes with the banking system. Hence, a negative relationship between financial market and bank deposits is expected.

Contrarily, the financial system architecture literature suggests that financial markets and the banking system compete in emerging and fragmented markets, whereas they complement each other in integrated markets (Song & Thakor, 2010), although that study was based on a bank lending view. In contrast, this essay assesses the impact of financial market development on the banking system from banks' funding perspective. The results show a negative relationship between financial markets and bank deposits in all countries and less financially developed economies. On the contrary, in highly financially developed economies, I find a positive relationship between

financial market development and bank deposits. Hence, I infer that banks and financial markets compete in general. However, this relationship varies with countries' financial development level. In highly financially developed and integrated economies, they complement each other, consistent with the arguments of Boot and Thakor (1997).

Financial development in a country further creates competition within its banking system. This competition affects the market power of banks in attracting deposits, which eventually determines bank deposit funding and composition. Hence, the third essay focuses on the impact of deposit competition on bank deposits funding and composition. This essay follows the Craig and Dinger (2013) approach to measure deposit competition, using deposit rates offered by banks to assess competition within the banking system. However, the data related to offered deposit rates are not available across countries. Therefore, interest expense relative to interest-bearing liabilities has been used as a proxy for deposit competition. I further employ interest cost of total retail deposits as a proxy for the interest rates offered to households for deposits.

The findings suggest a negative relationship between bank deposit funding and deposit competition. On the contrary, deposit competition helps attracting retail deposits and customers' time deposits in less financially developed economies. In highly financially developed economies, as interest cost increases, banks use other cheaper sources of funds such as deposits and borrowing from other banks to meet their loan demand, causing a decrease in retail deposit proportion. This negative relationship between bank deposit funding, composition and deposit competition in highly financially developed economies is due to the country's financial development. This allows banks to access other sources of funds and assist in decreasing interest costs. I further examine the effect of market concentration on bank deposit funding and composition. The results show a

negative impact of concentration on bank deposit funding and retail deposit proportion, suggesting a moral hazard issue.

5.1. Contributions of the thesis

The thesis has many contributions to the literature on bank deposits, liquidity management, and bank stability. There are very few studies that have used total deposits, deposit funding, and composition as dependent variables. Deposit funding and composition have been used as an explanatory variable in the bank stability and risk management literature (Khan et al., 2017; Vazquez & Federico, 2015). Moreover, Schlueter et al. (2015) have examined the impact of non-maturing deposits (transaction accounts) on asset-liability management (ALM) and deposit pricing. They argued that transaction accounts pose a major problem to the banks' ALM because of their stochastic cash flow pattern. Further, deposit funding has been used as an explanatory variable for determining the cost (Tortosa-Ausina, 2002), profit (Akhavain et al., 1997; Maudos et al., 2002) and technical efficiency of banks (Fujii, Managi, & Matousek, 2014; Miller & Noulas, 1996). Although bank deposit funding and composition have been used as important explanatory variables in banking literature, the literature is by and large silent on identifying the factors that determines bank deposit funding and composition.

To the best of my knowledge, the early research on bank deposit composition goes back to the paper of Carson (1959). He examined the relationship between bank size, deposit composition and bank earnings. Later, Bond (1971) investigated the effects of bank earnings on bank deposit composition in the United States banking market. There are a few studies focusing on bank deposit variability, which dates back to 1960-70 (Dewald & Dreese, 1970; Kane & Malkiel, 1965; Kaufman, 1972; Meyer, Nazma, & Cuevas, 1990; Rangarajan, 1966), but, this research was conducted in different economic environment, with changes since then.

The aftermath of GFC 2007-09 and implementation of Basel-III guidelines have highlighted the importance of bank deposits in the banking system (Khan et al., 2017), which has renewed academicians' interest in bank deposits. Recently, Streit et al. (2016) studied deposit volatility with respect to bank size, deposit composition, and types of customers among others, in the German banking system. In a theoretical paper, Arping (2019) has shown how capital regulation affects bank deposits. He showed that as banks' equity capital increases, they reduce their deposit bases and eventually decrease the cost of funding. In more recent research, economists have shown the importance of bank deposits for stability and increasing the lending capacity of banks (Hakenes & Schliephake, 2019; Li et al., 2019). However, most studies are country specific. There are very limited cross-country studies on the bank deposit funding and composition. The thesis aims to fill this gap by conducting a panel study including several countries⁵³. It not only examines the determinants of bank deposits in developed economies, but also provides an insight into developing economies' banking systems.

Apart from its academic contribution, the thesis postulates many policy implications, such as that governments and regulators should focus on improving countries' healthcare and education systems as these factors not only improve human capital, but also increase bank deposits. Moreover, the study suggests integration of financial markets and the banking system because both systems complement each other and hence co-evolve. Generally, regulators encourage competition within the banking system. However, high deposit competition encourages banks to obtain low cost fund such as interbank borrowing, bank deposits, and short-term borrowing, causing reduction in retail deposit proportion. Moreover, deposit rates are among the major factors attracting time deposits in less-financially developed economies. On the other hand, the increase in deposit cost

⁵³ First essay consists 70 countries, whereas second and third essay consist 88 and 75 countries respectively.

inspires banks to increase the proportion of low-cost funding, which makes the banking system less stable. Hence, regulators and banks should use interest rates cautiously. Moreover, academics and regulators generally recommend increasing equity capital to improve bank stability. However, the results show a negative relationship between bank deposits and equity capital suggesting a moral hazard issue.

5.2. Limitations and recommendations for future research

Every study has some limitations and this thesis is not an exception. In the first essay, I identify the relationship between human capital development and bank deposits in a panel study of 70 countries. I drop a few countries from the analysis, due to limited data availability. The data of primary and secondary enrolment for the selected countries is not available for the entire analysis period, therefore, an education index has been employed as a main variable to measure the education level. Moreover, I also believe that studying the impact of human capital development on different deposit products will give better insight. Similarly, in the second and third essays, deposit funding, retail, and time deposit proportions have been used as dependent variables. However, studying the impact of financial markets development and deposit competition on deposit products such as checking, savings, and time deposits can give better insights. In the second and third essays, I have included data for commercial banks only and dropped others such as cooperative, regional, and Islamic banks. In some countries, these institutions play a major role in the financial system.

In second essay, financial markets indices and the sub-indices have been employed as explanatory variables. These indices have regard to both stock and debt asset classes across domestic and international markets. Hence, it is difficult to find the impact of stock and debt market separately. A future study on these lines would not be a bad idea. In the third essay, due to limited

data availability of deposit interest rates according to deposit products, the interest cost of average interest-bearing liabilities has been used as an explanatory variable for deposit competition.

In a cross-country banking study, it is common to have an endogeneity issue and finding a suitable instrument is the one of the biggest challenges. This problem has been addressed by using the lagged level of endogenous variables as instrument variables. However, the lagged levels of endogenous variables are considered weak instruments.

5.3. Summary

This thesis has explored the determinants of bank deposits. In this regard, I examine the impact of human capital, financial market development, and deposit competition on bank deposits. The first two essays are country-based studies: (i) exploring the relationship between human capital development and bank deposits, and (ii) relationship between financial market development and bank deposits, whereas the third essay “Effects of deposit competition on bank deposits” is a bank level study in a cross-country set up. The thesis provides insights into how these factors influence bank deposits in developed (financially and/or economically) and developing (financially and/or economically) countries.

The results show that the development of healthcare system improve bank deposits in both developed and developing economies. To derive the benefits of education, a basic financial system structure is needed. A positive impact of education on bank deposits in highly financially developed economies has been found. However, it has been observed that this is not the case for less financially developed economies. The second essay results show that in less financially developed economies, the banking system and financial markets are fragmented, hence, they compete. On the other hand, in high financially developed economies, both complement each other

and coevolve. Moreover, the results show that high deposit competition encourages banks to obtain low-cost funds, causing reduction in deposit funding. However, in less financially developed economies, the increase in interest rates cause surge in the proportion of retail and time deposits. On the contrary, in highly financially developed economies, an increase in interest costs cause a decline in the retail deposit proportion.

The thesis proposes some policy implications such as a focus on human capital development and financial market integration to increase the bank deposits in the banking system. Since the banking and financial systems of countries are different from each other in many ways, regulators and banks should consider the differences among financial structure and economic environment of the countries before making rules and regulations. At last, the thesis highlights the limitation of the studies and outlines the scope for future research.

References

- Acharya, V. V., & Mora, N. (2012). *Are banks passive liquidity backstops? Deposit rates and flows during the 2007-2009 crisis*. National Bureau of Economic Research.
- Acharya, V. V., & Richardson, M. (2009). Causes of the financial crisis. *Critical review*, 21(2-3), 195-210.
- Acharya, V. V., Schnabl, P., & Suarez, G. (2013). Securitization without risk transfer. *Journal of Financial Economics*, 107(3), 515-536.
- Aghion, P., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. (2005). Competition and innovation: An inverted-U relationship. *The Quarterly Journal of Economics*, 120(2), 701-728.
- Agoraki, M.-E. K., Delis, M. D., & Pasiouras, F. (2011). Regulations, competition and bank risk-taking in transition countries. *Journal of Financial Stability*, 7(1), 38-48.
- Ahamed, M. M., & Mallick, S. K. (2019). Is financial inclusion good for bank stability? International evidence. *Journal of Economic Behavior & Organization*, 157, 403-427.
- Ahmed, F., Ahmed, N. e., Pissarides, C., & Stiglitz, J. (2020). Why inequality could spread COVID-19. *The Lancet Public Health*, 5(5), e240.
- 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(1), 95-139.
- Albertazzi, U., & Gambacorta, L. (2009). Bank profitability and the business cycle. *Journal of Financial Stability*, 5(4), 393-409.
- Allen, F. (1993). Stock markets and resource allocation. *Capital markets and financial intermediation*, 81, 81-108.
- Allen, F., & Carletti, E. (2010). The Roles of Banks in Financial System. In A. N. Berger, P. Molyneux, & J. O. S. Wilson (Eds.), *The Oxford Handbook of Banking* (Vol. First). United States: Oxford University Press.
- Allen, F., Carletti, E., & Marquez, R. (2015). Deposits and bank capital structure. *Journal of Financial Economics*, 118(3), 601-619.
- Allen, F., Demirgüç-Kunt, A., Klapper, L., & Peria, M. S. M. (2016). The foundations of financial inclusion: Understanding ownership and use of formal accounts. *Journal of Financial Intermediation*, 27(c), 1-30.
- Allen, F., & Santomero, A. M. (1997). The theory of financial intermediation. *Journal of Banking & Finance*, 21(11-12), 1461-1485.
- Altunbaş, Y., & Thornton, J. (2019). Finance and income inequality revisited. *Finance Research Letters*, 101355.
- Andrianova, S., Demetriades, P., & Shortland, A. (2008). Government ownership of banks, institutions, and financial development. *Journal of Development Economics*, 85(1), 218-252.
- Anginer, D., Demirgüç-Kunt, A., & Mare, D. S. (2018). Bank Capital, Institutional Environment and Systemic Stability. *Journal of Financial Stability*, 37, 97-106.
- Araujo, J. D., David, A. C., van Hombecck, C., & Papageorgiou, C. (2017). Joining the club? Procyclicality of private capital inflows in lower income developing economies. *Journal of International Money and Finance*, 70, 157-182.
- Arcand, J. L., Berkes, E., & Panizza, U. (2015). Too much finance? *Journal of Economic Growth*, 20(2), 105-148.

- Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58(2), 277-297.
- Arestis, P., Demetriades, P. O., & Luintel, K. B. (2001). Financial development and economic growth: the role of stock markets. *Journal of Money, Credit and Banking*, 33(1), 16-41.
- Arora, R. (2012). Financial inclusion and human capital in developing Asia: The Australian connection. *Third World Quarterly*, 33(1), 177-197.
- Arora, S. (2001). Health, human productivity, and long-term economic growth. *The Journal of Economic History*, 61(3), 699-749.
- Arping, S. (2019). Capital regulation and bank deposits. *Review of Finance*, 23(4), 831-853.
- Ashraf, B. N. (2017). Political institutions and bank risk-taking behavior. *Journal of Financial Stability*, 29, 13-35.
- Bain, J. S. (2013). *Barriers to new competition: Their character and consequences in manufacturing industries*. Cambridge, MA: Harvard University Press.
- Baldacci, E., Clements, B., Gupta, S., & Cui, Q. (2008). Social spending, human capital, and growth in developing countries. *World Development*, 36(8), 1317-1341.
- Baltagi, B. H., Bresson, G., & Pirotte, A. (2003). Fixed effects, random effects or Hausman–Taylor?: A pretest estimator. *Economics Letters*, 79(3), 361-369.
- Barth, J. R., Lin, C., Ma, Y., Seade, J., & Song, F. M. (2013). Do bank regulation, supervision and monitoring enhance or impede bank efficiency? *Journal of Banking & Finance*, 37(8), 2879-2892.
- Basu, A. K., & Drew, M. E. (2009). Portfolio size effect in retirement accounts: What does it imply for lifecycle asset allocation funds? *Journal of Portfolio Management*, 35(3), 61.
- BCBS, B. C. (2010a). Basel III: A global regulatory framework for more resilient banks and banking systems. *Basel Committee on Banking Supervision, Basel*
- BCBS, B. C. (2010b). Basel III: International framework for liquidity risk measurement, standards and monitoring
- BCBS, B. C. (2013). Basel III: The Liquidity Coverage Ratio and liquidity risk monitoring tools.
- BCBS, B. C. (2014). Basel III: the net stable funding ratio.
- Bech, M., Christiansen, T., Khoman, E., Lauridsen, J., & Weale, M. (2011). Ageing and health care expenditure in EU-15. *The European Journal of Health Economics*, 12(5), 469-478.
- Beck, T., De Jonghe, O., & Schepens, G. (2013). Bank competition and stability: cross-country heterogeneity. *Journal of Financial Intermediation*, 22(2), 218-244.
- Beck, T., & Demirguc-Kunt, A. (2009). *Financial institutions and markets across countries and over time-data and analysis*: The World Bank.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2006). Bank concentration, competition, and crises: First results. *Journal of Banking & Finance*, 30(5), 1581-1603.
- Beck, T., Demirgüç-Kunt, A., & Levine, R. (2010). Financial institutions and markets across countries and over time: The updated financial development and structure database. *The World Bank Economic Review*, 24(1), 77-92.
- Bellemare, M. F., Masaki, T., & Pepinsky, T. B. (2017). Lagged explanatory variables and the estimation of causal effect. *The Journal of Politics*, 79(3), 949-963.
- Beltratti, A., & Stulz, R. M. (2012). The credit crisis around the globe: Why did some banks perform better? *Journal of Financial Economics*, 105(1), 1-17.
- Berger, A. N., & Bouwman, C. H. (2013). How does capital affect bank performance during financial crises? *Journal of Financial Economics*, 109(1), 146-176.

- Berger, A. N., Demirgüç-Kunt, A., Levine, R., & Haubrich, J. G. (2004). Bank concentration and competition: An evolution in the making. *Journal of Money, Credit, and Banking*, 36(3), 433-451.
- Berger, A. N., & Hannan, T. H. (1989). The price-concentration relationship in banking. *The Review of Economics and Statistics*, 71(2), 291-299.
- Berger, A. N., Klapper, L. F., & Turk-Ariss, R. (2009). Bank competition and financial stability. *Journal of Financial Services Research*, 35(2), 99-118.
- Berger, A. N., Klapper, L. F., & Turk-Ariss, R. (2017). Bank Competition and Financial Stability. In *Handbook of Competition in Banking and Finance*: Edward Elgar Publishing.
- Berglof, E., & Bolton, P. (2002). The great divide and beyond: Financial architecture in transition. *Journal of Economic Perspectives*, 16(1), 77-100.
- Bernanke, B. S. (2005). *The global saving glut and the US current account deficit*. Federal Reserve System (U.S.).
- Bernheim, B. D., Garrett, D. M., & Maki, D. M. (2001). Education and saving:: The long-term effects of high school financial curriculum mandates. *Journal of Public Economics*, 80(3), 435-465.
- Berry, L. L. (2000). Cultivating service brand equity. *Journal of the Academy of marketing science*, 28(1), 128-137.
- Bikker, J. A., Broeders, D. W. G. A., Hollanders, D. A., & Ponds, E. H. M. (2012). Pension Funds' Asset Allocation and Participant Age: A Test of the Life-Cycle Model. *Journal of Risk and Insurance*, 79(3), 595-618.
- Bikker, J. A., & Gerritsen, D. F. (2017). Determinants of Interest Rates on Time Deposits and Savings Accounts: Macro Factors, Bank Risk, and Account Features. *International Review of Finance*, 18(2), 169-216.
- Bikker, J. A., & Haaf, K. (2002). Competition, concentration and their relationship: An empirical analysis of the banking industry. *Journal of Banking & Finance*, 26(11), 2191-2214.
- Bikker, J. A., & Metzmakers, P. A. J. (2005). Bank provisioning behaviour and procyclicality. *Journal of International Financial Markets, Institutions and Money*, 15(2), 141-157.
- Bloom, D. E., & Canning, D. (2000). The health and wealth of nations. *Science*, 287(5456), 1207-1209.
- Blundell, R., & Bond, S. (2000). GMM estimation with persistent panel data: an application to production functions. *Econometric Reviews*, 19(3), 321-340.
- Bolt, W., de Haan, L., Hoeberichts, M., van Oordt, M. R. C., & Swank, J. (2012). Bank profitability during recessions. *Journal of Banking & Finance*, 36(9), 2552-2564.
- Bolton, P., & Freixas, X. (2000). Equity, bonds, and bank debt: Capital structure and financial market equilibrium under asymmetric information. *Journal of Political Economy*, 108(2), 324-351.
- Bond, R. E. (1971). Deposit composition and commercial bank earnings. *The Journal of Finance*, 26(1), 39-50.
- Boot, A. W. A., & Thakor, A. V. (1997). Financial system architecture. *The Review of Financial Studies*, 10(3), 693-733.
- Bordo, M. D., Redish, A., & Rockoff, H. (2015). Why didn't Canada have a banking crisis in 2008 (or in 1930, or 1907, or...)? *The Economic History Review*, 68(1), 218-243.
- Bourke, P. (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia. *Journal of Banking & Finance*, 13(1), 65-79.

- Boyd, J. H., & De Nicolo, G. (2005). The theory of bank risk taking and competition revisited. *The Journal of Finance*, 60(3), 1329-1343.
- Brunnermeier, M. K. (2009). Deciphering the liquidity and credit crunch 2007-2008. *Journal of Economic Perspectives*, 23(1), 77-100.
- Buckle, M., & Thompson, J. L. (1992). *The United Kingdom financial system in transition: theory and practice*: Manchester University Press.
- Bun, M. J., & Windmeijer, F. (2010). The weak instrument problem of the system GMM estimator in dynamic panel data models. *The Econometrics Journal*, 13(1), 95-126.
- Cabral, R. (2013). A perspective on the symptoms and causes of the financial crisis. *Journal of Banking & Finance*, 37(1), 103-117.
- Calderón, C., & Liu, L. (2003). The direction of causality between financial development and economic growth. *Journal of Development Economics*, 72(1), 321-334.
- Calem, P. S., & Carlino, G. A. (1991). The concentration/conduct relationship in bank deposit markets. *The Review of Economics and Statistics*, 73(2), 268-276.
- Calomiris, C. W., & Haber, S. H. (2015). *Fragile by design: The political origins of banking crises and scarce credit* (Vol. 48): Princeton University Press.
- Calomiris, C. W., & Kahn, C. M. (1991). The role of demandable debt in structuring optimal banking arrangements. *The American Economic Review*, 497-513.
- Calvet, L. E., Campbell, J. Y., & Sodini, P. (2007). Down or out: Assessing the welfare costs of household investment mistakes. *Journal of Political Economy*, 115(5), 707-747.
- Campbell, J. Y., Viceira, L. M., & Viceira, L. M. (2002). *Strategic asset allocation: portfolio choice for long-term investors*: Clarendon Lectures in Economic.
- Canto, V. A., Joines, D. H., & Laffer, A. B. (1981). Tax Rates, Factor Employment, and Market Production. In *The supply-side effects of economic policy* (pp. 3-32): Springer.
- Carbó, S., Humphrey, D., Maudos, J., & Molyneux, P. (2009). Cross-country comparisons of competition and pricing power in European banking. *Journal of International Money and Finance*, 28(1), 115-134.
- Carletti, E., & Hartmann, P. (2002). *Competition and Stability: what's Special about Banking?* In Vol. 2. *Monetary history, exchanges rates and financial markets: Essays in honour of Charles Goodhart* (pp. 202-229).
- Carson, D. (1959). Bank Earnings and the Competition for Savings Deposits. *Journal of Political Economy*, 67(6), 580-588.
- Case, A., Lubotsky, D., & Paxson, C. (2002). Economic status and health in childhood: The origins of the gradient. *The American Economic Review*, 92(5), 1308-1334.
- Cecchetti, S., & Kharroubi, E. (2012). *Reassessing the impact of finance on growth*. Bank for International Settlements. Retrieved from <https://EconPapers.repec.org/RePEc:bis:biswps:381>
- Célerier, C., & Matray, A. (2019). Bank-branch supply, financial inclusion, and wealth accumulation. *The Review of Financial Studies*, 32(12), 4767-4809.
- Chan, Y.-S., Greenbaum, S. I., & Thakor, A. V. (1986). Information reusability, competition and bank asset quality. *Journal of Banking & Finance*, 10(2), 243-253.
- Cheung, D., & Padiou, Y. (2015). Heterogeneity of the effects of health insurance on household savings: Evidence from rural China. *World Development*, 66, 84-103.
- Chinn, M. D., & Ito, H. (2006). What matters for financial development? Capital controls, institutions, and interactions. *Journal of Development Economics*, 81(1), 163-192.

- Chortareas, G. E., Girardone, C., & Ventouri, A. (2013). Financial freedom and bank efficiency: Evidence from the European Union. *Journal of Banking & Finance*, 37(4), 1223-1231.
- Claessens, S., Coleman, N., & Donnelly, M. (2018). “Low-For-Long” interest rates and banks’ interest margins and profitability: Cross-country evidence. *Journal of Financial Intermediation*, 35, 1-16.
- Claessens, S., & Laeven, L. (2004). What drives bank competition? Some international evidence. *Journal of Money, Credit & Banking*, 36(3), S563-S563.
- Clemente, J., Marcuello, C., & Montañés, A. (2008). Pharmaceutical expenditure, total health-care expenditure and GDP. *Health Economics*, 17(10), 1187-1206.
- Cole, S., Sampson, T., & Zia, B. (2011). Prices or knowledge? What drives demand for financial services in emerging markets? *The Journal of Finance*, 66(6), 1933-1967.
- Congress, U. S. (2010). *Dodd-Frank Wall Street Reform and Consumer Protection Act: Conference Report (to Accompany HR 4173)* (Vol. US Government Printing Office). USA: U.S. House Committee of Financial Services.
- Corrocher, N. (2006). Internet adoption in Italian banks: An empirical investigation. *Research Policy*, 35(4), 533-544.
- Corvoisier, S., & Gropp, R. (2002). Bank concentration and retail interest rates. *Journal of Banking & Finance*, 26(11), 2155-2189.
- Craig, B. R., & Dinger, V. (2013). Deposit market competition, wholesale funding, and bank risk. *Journal of Banking & Finance*, 37(9), 3605-3622.
- Crane, D. B., & Crotty, J. R. (1967). A two-stage forecasting model: Exponential smoothing and multiple regression. *Management Science*, 13(8), B-501.
- Crotty, J. (2009). Structural causes of the global financial crisis: a critical assessment of the ‘new financial architecture’. *Cambridge Journal of Economics*, 33(4), 563-580.
- Cukierman, A. (2013). Monetary policy and institutions before, during, and after the global financial crisis. *Journal of Financial Stability*, 9(3), 373-384.
- Dafe, F., Essers, D., & Volz, U. (2018). Localising sovereign debt: The rise of local currency bond markets in sub-Saharan Africa. *The World Economy*, 41(12), 3317-3344.
- Dagher, J., & Kazimov, K. (2015). Banks’ liability structure and mortgage lending during the financial crisis. *Journal of Financial Economics*, 116(3), 565-582.
- Damme, W. V., Leemput, L. V., Por, I., Hardeman, W., & Meessen, B. (2004). Out-of-pocket health expenditure and debt in poor households: evidence from Cambodia. *Tropical Medicine & International Health*, 9(2), 273-280.
- Davies, R., Richardson, P., Katinaite, V., & Manning, M. (2010). Evolution of the UK banking system. *Bank of England Quarterly Bulletin*, 50(4), 321-332.
- De Bandt, O., & Davis, E. P. (2000). Competition, contestability and market structure in European banking sectors on the eve of EMU. *Journal of Banking & Finance*, 24(6), 1045-1066.
- De Freitas, N. e. M., & Martins, J. O. (2014). Health, pension benefits and longevity: How they affect household savings? *The Journal of the Economics of Ageing*, 3, 21-28.
- De Graeve, F., De Jonghe, O., & Vander Vennet, R. (2007). Competition, transmission and bank pricing policies: Evidence from Belgian loan and deposit markets. *Journal of Banking & Finance*, 31(1), 259-278.
- Deans, C., & Stewart, C. (2012). Banks’ funding costs and lending rates. *Reserve Bank of Australia Bulletin*, 2012, 37-43.

- Deaton, A. (1989). Saving in developing countries: Theory and review. *The World Bank Economic Review*, 3(suppl 1), 61-96.
- Deaton, A. (2003). Health, inequality, and economic development. *Journal of Economic Literature*, 41(1), 113-158.
- Delis, M. D., Hasan, I., & Kazakis, P. (2013). Bank regulations and income inequality: Empirical evidence. *Review of Finance*, 18(5), 1811-1846.
- Demirgüç-Kunt, A., & Huizinga, H. (2010). Bank activity and funding strategies: The impact on risk and returns. *Journal of Financial Economics*, 98(3), 626-650.
- Demirgüç-Kunt, A., Kane, E., & Laeven, L. (2015). Deposit insurance around the world: A comprehensive analysis and database. *Journal of Financial Stability*, 20, 155-183.
- Demirguc-Kunt, A., & Klapper, L. (2012). *Measuring financial inclusion: The global index database*: The World Bank.
- Demirgüç-Kunt, A., & Klapper, L. (2013). Measuring financial inclusion: Explaining variation in use of financial services across and within countries. *Brookings Papers on Economic Activity*, 2013(1), 279-340.
- Demirguc-Kunt, A., & Levine, R. (2008). *Finance, financial sector policies, and long-run growth*: The World Bank.
- Demirgüç-Kunt, A., & Levine, R. (1996). Stock market development and financial intermediaries: stylized facts. *The World Bank Economic Review*, 10(2), 291-321.
- Demirgüç-Kunt, A., & Maksimovic, V. (1996). Stock market development and financing choices of firms. *The World Bank Economic Review*, 10(2), 341-369.
- Dewald, W. G., & Dreese, G. R. (1970). Bank behavior with respect to deposit variability. *The Journal of Finance*, 25(4), 869-879.
- Diamond, D. W. (1984). Financial intermediation and delegated monitoring. *The Review of Economic Studies*, 51(3), 393-414.
- Diamond, D. W. (1991). Monitoring and reputation: The choice between bank loans and directly placed debt. *Journal of Political Economy*, 99(4), 689-721.
- Diamond, D. W., & Dybvig, P. H. (1983). Bank runs, deposit insurance, and liquidity. *The journal of political economy*, 401-419.
- Diamond, D. W., & Rajan, R. G. (2001). Liquidity risk, liquidity creation, and financial fragility: A theory of banking. *Journal of Political Economy*, 109(2), 287-327.
- Diamond, D. W., & Rajan, R. G. (2012). Illiquid banks, financial stability, and interest rate policy. *Journal of Political Economy*, 120(3), 552-591.
- Dick, A. A. (2007). Market size, service quality, and competition in banking. *Journal of Money, Credit and Banking*, 39(1), 49-81.
- Dick, A. A., & Hannan, T. H. (2010). *Competition and Antitrust Policy in Banking*. United States: Oxford University Press.
- Dietrich, A., & Wanzenried, G. (2014). The determinants of commercial banking profitability in low-, middle-, and high-income countries. *The Quarterly Review of Economics and Finance*, 54(3), 337-354.
- Doumpos, M., Hasan, I., & Pasiouras, F. (2017). Bank overall financial strength: Islamic versus conventional banks. *Economic Modelling*, 64(C), 513-523.
- Du, D., & Rousse, W. (2018). Foreign capital flows, credit spreads, and the business cycle. *Journal of International Financial Markets, Institutions and Money*, 57(C), 59-79.

- Duong, H. N., Rhee, S. G., & Vu, V. (2018). Do Banks Learn from Other Financial Markets? Evidence from Loan Contract Design. *Evidence from Loan Contract Design (May 10, 2018)*
- Durusu-Ciftci, D., Ispir, M. S., & Yetkiner, H. (2017). Financial development and economic growth: Some theory and more evidence. *Journal of Policy Modeling*, 39(2), 290-306.
- Edwards, R. D. (2008). Health risk and portfolio choice. *Journal of Business & Economic Statistics*, 26(4), 472-485.
- Egan, M., Hortaçsu, A., & Matvos, G. (2017). Deposit competition and financial fragility: Evidence from the us banking sector. *The American Economic Review*, 107(1), 169-216.
- Evans, D. A., Green, C. J., & Murinde, V. (2002). Human capital and financial development in economic growth: new evidence using the translog production function. *International Journal of Finance & Economics*, 7(2), 123-140.
- Fan, E., & Zhao, R. (2009). Health status and portfolio choice: Causality or heterogeneity? *Journal of Banking & Finance*, 33(6), 1079-1088.
- Farag, M., Nandakumar, A. K., Wallack, S., Hodgkin, D., Gaumer, G., & Erbil, C. (2013). Health expenditures, health outcomes and the role of good governance. *International Journal of Health Care Finance and Economics*, 13(1), 33-52.
- Feldman, R. J., & Schmidt, J. (2001). Increased use of uninsured deposits. *Fedgazette*, 13(2), 18-19.
- Fisher, P. J., & Montalto, C. P. (2011). Loss aversion and saving behavior: Evidence from the 2007 US Survey of Consumer Finances. *Journal of Family and Economic Issues*, 32(1), 4-14.
- Flannery, M. J. (2001). The faces of “market discipline”. *Journal of Financial Services Research*, 20(2), 107-119.
- Frankel, A. B., Montgomery, J. D., Friedman, B. M., & Gertler, M. (1991). Financial structure: an international perspective. *Brookings Papers on Economic Activity*, 1991(1), 257-310.
- Fratzscher, M. (2002). Financial market integration in Europe: on the effects of EMU on stock markets. *International Journal of Finance & Economics*, 7(3), 165-193.
- Fratzscher, M., König, P. J., & Lambert, C. (2016). Credit provision and banking stability after the Great Financial Crisis: The role of bank regulation and the quality of governance. *Journal of International Money and Finance*, 66(C), 113-135.
- Friedrich, C., Schnabel, I., & Zettelmeyer, J. (2013). Financial integration and growth—Why is Emerging Europe different? *Journal of International Economics*, 89(2), 522-538.
- Fu, X., Lin, Y., & Molyneux, P. (2014). Bank competition and financial stability in Asia Pacific. *Journal of Banking & Finance*, 38(C), 64-77.
- Fujii, H., Managi, S., & Matousek, R. (2014). Indian bank efficiency and productivity changes with undesirable outputs: a disaggregated approach. *Journal of Banking & Finance*, 38(1), 41-50.
- Gambacorta, L. (2008). How do banks set interest rates? *European Economic Review*, 52(5), 792-819.
- Genoni, M. E. (2012). Health shocks and consumption smoothing: Evidence from Indonesia. *Economic Development and Cultural Change*, 60(3), 475-506.
- Ghosh, A. (2015). Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states. *Journal of Financial Stability*, 20(C), 93-104.

- Ghosh, M. (2006). Economic growth and human development in Indian states. *Economic and Political Weekly*, 3321-3329.
- Gilkeson, J. H., List, J. A., & Ruff, C. K. (1999). Evidence of early withdrawal in time deposit portfolios. *Journal of Financial Services Research*, 15(2), 103-122.
- Gilleskie, D. B., & Harrison, A. L. (1998). The effect of endogenous health inputs on the relationship between health and education. *Economics of Education Review*, 17(3), 279-295.
- Goetz, M. R. (2018). Competition and bank stability. *Journal of Financial Intermediation*, 35(PA), 57-69.
- Goh, K. H., & Kauffman, R. J. (2013). Firm strategy and the Internet in US commercial banking. *Journal of Management Information Systems*, 30(2), 9-40.
- Goldberg, L. G., & Saunders, A. (1980). The causes of US bank expansion overseas: The case of Great Britain. *Journal of Money, Credit and Banking*, 12(4), 630-643.
- Goldsmith-Pinkham, P., & Yorulmazer, T. (2010). Liquidity, bank runs, and bailouts: spillover effects during the Northern Rock episode. *Journal of Financial Services Research*, 37(2-3), 83-98.
- Goodhart, C. (2008). Liquidity risk management. *Banque de France Financial Stability Review*, 11, 39-44.
- Goodhart, C., Hofmann, B., & Segoviano, M. (2004). Bank regulation and macroeconomic fluctuations. *Oxford Review of Economic Policy*, 20(4), 591-615.
- Gray, S. (2011). *Central bank balances and reserve requirements*: International Monetary Fund.
- Greenwood, J., & Smith, B. D. (1997). Financial markets in development, and the development of financial markets. *Journal of Economic Dynamics and Control*, 21(1), 145-181.
- Gropper, D. M., Jahera, J. S., & Park, J. C. (2015). Political power, economic freedom and Congress: Effects on bank performance. *Journal of Banking & Finance*, 60(11), 76-92.
- Grossman, M. (1972). On the concept of health capital and the demand for health. *Journal of Political Economy*, 80(2), 223-255.
- Guiso, L., & Sodini, P. (2013). Household finance: An emerging field. In *Handbook of the Economics of Finance* (Vol. 2, pp. 1397-1532): Elsevier.
- Gupta, M. P., Tressel, M. T., & Detragiache, M. E. (2005). *Finance in Lower Income Countries: An Empirical Exploration*: International Monetary Fund.
- Gupta, S., Verhoeven, M., & Tiongson, E. R. (2002). The effectiveness of government spending on education and health care in developing and transition economies. *European Journal of Political Economy*, 18(4), 717-737.
- Gurley, J. G., & Shaw, E. S. (1955). Financial aspects of economic development. *The American Economic Review*, 45(4), 515-538.
- Gürlük, S. (2009). Economic growth, industrial pollution and human development in the Mediterranean Region. *Ecological Economics*, 68(8), 2327-2335.
- Guruswamy, M., Mazumdar, S., & Mazumdar, P. (2008). Public financing of health services in India: an analysis of central and state government expenditure. *Journal of Health Management*, 10(1), 49-85.
- Hakenes, H., & Schliephake, E. (2019). The Deposit Base–Multibanking and Bank Stability. *SSRN*
- Harbert, T. (2019). Here's how much the 2008 bailouts really cost. *Economy*. Retrieved 11 March 2020

- Harnay, S., & Scialom, L. (2016). The influence of the economic approaches to regulation on banking regulations: a short history of banking regulations. *Cambridge Journal of Economics*, 40(2), 401-426.
- Hartwig, J. (2008). What drives health care expenditure?—Baumol's model of 'unbalanced growth' revisited. *Journal of Health Economics*, 27(3), 603-623.
- Hasan, I., Koetter, M., & Wedow, M. (2009). Regional growth and finance in Europe: Is there a quality effect of bank efficiency? *Journal of Banking & Finance*, 33(8), 1446-1453.
- He, J., Qian, J., & Strahan, P. E. (2011). Credit ratings and the evolution of the mortgage-backed securities market. *The American Economic Review*, 101(3), 131-135.
- Heid, F. (2007). The cyclical effects of the Basel II capital requirements. *Journal of Banking & Finance*, 31(12), 3885-3900.
- Hellmann, T. F., Murdock, K. C., & Stiglitz, J. E. (2000). Liberalization, moral hazard in banking, and prudential regulation: Are capital requirements enough? *The American Economic Review*, 90(1), 147-165.
- Heritage, F., & Wall Street, J. (2009). *The index of economic freedom*: Heritage Foundation.
- Hermes, N., & Lensink, R. (2003). Foreign direct investment, financial development and economic growth. *The Journal of Development Studies*, 40(1), 142-163.
- Hernández-Murillo, R., Llobet, G., & Fuentes, R. (2010). Strategic online banking adoption. *Journal of Banking & Finance*, 34(7), 1650-1663.
- Hilgert, M. A., Hogarth, J. M., & Beverly, S. G. (2003). Household financial management: The connection between knowledge and behavior. *Federal Reserve Bulletin*, 89(7), 309.
- Hogarth, J. M., Anguelov, C. E., & Lee, J. (2005). Who has a bank account? Exploring changes over time, 1989–2001. *Journal of Family and Economic Issues*, 26(1), 7-30.
- Hogarth, G., Reis, R., & Saporta, V. (2002). Costs of banking system instability: Some empirical evidence. *Journal of Banking & Finance*, 26(5), 825-855.
- Holmes, F. W. (1972). *Money, finance and the economy: an introduction to the New Zealand financial system*: Auckland, NZ: Heinemann Educational Books.
- Hsieh, M.-F., & Lee, C.-C. (2010). The puzzle between banking competition and profitability can be solved: international evidence from bank-level data. *Journal of Financial Services Research*, 38(2), 135-157.
- Hsu, M. (2013). Health insurance and precautionary saving: A structural analysis. *Review of Economic Dynamics*, 16(3), 511-526.
- Huang, R., & Ratnovski, L. (2009). *Why are Canadian banks more resilient?* : International Monetary Fund.
- Huang, R., & Ratnovski, L. (2011). The dark side of bank wholesale funding. *Journal of Financial Intermediation*, 20(2), 248-263.
- Hubbard, R. G. (2007). *Money, the Financial System and the Economy*: Addison-Wesley Reading, MA.
- Hubbard, R. G., & O'Brien, A. P. (2012a). The Economics of Banking. In S. Yagan (Ed.), *Money, Banking, and the Financial System* (1st ed.). USA: Pearson Education, Inc.
- Hubbard, R. G., & O'Brien, A. P. (2012b). The Term Structure of Interest Rates. In S. Yagan (Ed.), *Money, Banking, and the Financial System*. USA: Pearson Education, Inc.
- Hutchison, D. E. (1995). Retail bank deposit pricing: An intertemporal asset pricing approach. *Journal of Money, Credit and Banking*, 27(1), 217-231.
- Iqbal, N., & Daly, V. (2014). Rent seeking opportunities and economic growth in transitional economies. *Economic Modelling*, 37(C), 16-22.

- Irlacher, M., & Unger, F. (2018). Capital market imperfections and trade liberalization in general equilibrium. *Journal of Economic Behavior & Organization*, 145(C), 402-423.
- Iyer, R., Lærkholm Jensen, T., Johannesen, N., & Sheridan, A. (2019). The Distortive Effects of Too Big To Fail: Evidence from the Danish Market for Retail Deposits. *The Review of Financial Studies*, 32(12), 4653-4695.
- Iyer, R., Puri, M., & Ryan, N. (2012). Understanding bank runs: do depositors monitor banks? *The American Economic Review*, 102(4), 1414-1445.
- Jappelli, T., Pistaferri, L., & Weber, G. (2007). Health care quality, economic inequality, and precautionary saving. *Health Economics*, 16(4), 327-346.
- Jimenez, E., Nguyen, V., & Patrinos, H. A. (2012). *Stuck in the middle? Human capital development and economic growth in Malaysia and Thailand*: The World Bank.
- Jiménez, G., Lopez, J. A., & Saurina, J. (2013). How does competition affect bank risk-taking? *Journal of Financial Stability*, 9(2), 185-195.
- Jokivuolle, E., Pesola, J., & Viren, M. (2015). Why is credit-to-GDP a good measure for setting countercyclical capital buffers? *Journal of Financial Stability*, 18(C), 117-126.
- Kaminsky, G. L., & Reinhart, C. M. (1999). The twin crises: the causes of banking and balance-of-payments problems. *The American Economic Review*, 89(3), 473-500.
- Kaminsky, G. L., & Schmukler, S. L. (2008). Short-run pain, long-run gain: Financial liberalization and stock market cycles. *Review of Finance*, 12(2), 253-292.
- Kane, E. J., & Malkiel, B. G. (1965). Bank portfolio allocation, deposit variability, and the availability doctrine. *The Quarterly Journal of Economics*, 79(1), 113-134.
- Karim, D., Liadze, I., Barrell, R., & Davis, E. P. (2013). Off-balance sheet exposures and banking crises in OECD countries. *Journal of Financial Stability*, 9(4), 673-681.
- Kaufman, G. G. (1972). Deposit variability and bank size. *Journal of Financial and Quantitative Analysis*, 7(05), 2087-2096.
- Kaufmann, D. K. A. M. M. (2007). *The Worldwide Governance Indicators Project : Answering The Critics*: The World Bank. doi:10.1596/1813-9450-4149
- Keaveney, S. M. (1995). Customer switching behavior in service industries: An exploratory study. *The Journal of Marketing*, 59(2), 71-82.
- Keeley, M. C. (1990). Deposit insurance, risk, and market power in banking. *The American Economic Review*, 80(5), 1183-1200.
- Khan, M. S., Scheule, H., & Wu, E. (2017). Funding liquidity and bank risk taking. *Journal of Banking & Finance*, 82(C), 203-216.
- Kim, H., Batten, J. A., & Ryu, D. (2020). Financial crisis, bank diversification, and financial stability: OECD countries. *International Review of Economics & Finance*, 65, 94-104.
- King, M. R. (2013). The Basel III net stable funding ratio and bank net interest margins. *Journal of Banking & Finance*, 37(11), 4144-4156.
- Kleibergen, F. (2005). Testing parameters in GMM without assuming that they are identified. *Econometrica*, 73(4), 1103-1123.
- Koch, T. W., MacDonald, S. S., Edwards, V., & Duran, R. E. (2014). *Bank Management: A Decision Making Perspective*. Singapore: CENGAGE Learning.
- Köhler, M. (2015). Which banks are more risky? The impact of business models on bank stability. *Journal of Financial Stability*, 16(C), 195-212.
- Konish, L. (2019, 11 Feb 2019). This is the real reason most Americans file for bankruptcy. *Personal Finance*. Retrieved 12 Aug 2019 2019 from

<https://www.cnbc.com/2019/02/11/this-is-the-real-reason-most-americans-file-for-bankruptcy.html>

- Korajczyk, R. A. (1996). A measure of stock market integration for developed and emerging markets. *The World Bank Economic Review*, 10(2), 267-289.
- Kotz, D. M. (2009). The financial and economic crisis of 2008: A systemic crisis of neoliberal capitalism. *Review of Radical Political Economics*, 41(3), 305-317.
- Kraft, E., & Galac, T. (2007). Deposit interest rates, asset risk and bank failure in Croatia. *Journal of Financial Stability*, 2(4), 312-336.
- Krieger, T., & Meierrieks, D. (2016). Political capitalism: The interaction between income inequality, economic freedom and democracy. *European Journal of Political Economy*, 100(45), 115-132.
- Krugman, P. (2009). Revenge of the Glut. Retrieved 8 November 2019 from <https://www.nytimes.com/2009/03/02/opinion/02krugman.html>
- Kutzin, J. (2001). A descriptive framework for country-level analysis of health care financing arrangements. *Health Policy*, 56(3), 171-204.
- Lane, P. R., & Milesi-Ferretti, G. M. (2011). The cross-country incidence of the global crisis. *IMF Economic Review*, 59(1), 77-110.
- Law, S. H., & Singh, N. (2014). Does too much finance harm economic growth? *Journal of Banking & Finance*, 41(C), 36-44.
- Le Lesle, M. V. (2012). *Bank Debt in Europe: "Are Funding Models Broken"*: International Monetary Fund.
- Leroy, A., & Lucotte, Y. (2017). Is there a competition-stability trade-off in European banking? *Journal of International Financial Markets, Institutions and Money*, 46, 199-215.
- Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature*, 35(2), 688-726.
- Levine, R. (1998). The legal environment, banks, and long-run economic growth. *Journal of Money, Credit and Banking*, 30(3), 596-613.
- Levine, R. (2002). Bank-based or market-based financial systems: which is better? *Journal of Financial Intermediation*, 11(4), 398-428.
- Levine, R., & Zervos, S. (1999). *Stock markets, banks, and economic growth*: The World Bank.
- Li, L., Loutskina, E., & Strahan, P. E. (2019). *Deposit market power, funding stability and long-term credit* (No. 0898-2937). National Bureau of Economic Research.
- Liu, H., Molyneux, P., & Nguyen, L. H. (2012). Competition and risk in South East Asian commercial banking. *Applied Economics*, 44(28), 3627-3644.
- Liu, H., Molyneux, P., & Wilson, J. O. S. (2013). Competition and stability in European banking: a regional analysis. *The Manchester School*, 81(2), 176-201.
- Loening, J. (2005). *Effects of primary, secondary, and tertiary education on economic growth: evidence from Guatemala*. The World Bank.
- Lusardi, A. (2008). *Household saving behavior: The role of financial literacy, information, and financial education programs* (No. 0898-2937). National Bureau of Economic Research.
- Lusardi, A., & Mitchell, O. S. (2007). Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics*, 54(1), 205-224.
- Lusardi, A., & Mitchell, O. S. (2011). *Financial literacy and planning: Implications for retirement wellbeing*. National Bureau of Economic Research.
- Lusardi, A., & Mitchell, O. S. (2007). Financial literacy and retirement preparedness: Evidence and implications for financial education. *Business Economics*, 42(1), 35-44.

- Lusardi, A., Schneider, D. J., & Tufano, P. (2011). *Financially fragile households: Evidence and implications*. National Bureau of Economic Research.
- Marmot, M. (2002). The influence of income on health: views of an epidemiologist. *Health Affairs*, 21(2), 31-46.
- Martinez Peria, M. S., & Schmukler, S. L. (2001). Do depositors punish banks for bad behavior? Market discipline, deposit insurance, and banking crises. *The Journal of Finance*, 56(3), 1029-1051.
- Matutes, C., & Vives, X. (1996). Competition for deposits, fragility, and insurance. *Journal of Financial Intermediation*, 5(2), 184-216.
- Maudos, J. n., Pastor, J. M., Pérez, F., & Quesada, J. (2002). Cost and profit efficiency in European banks. *Journal of International Financial Markets, Institutions and Money*, 12(1), 33-58.
- McCulloch, N., & Baulch, B. (2000). Simulating the impact of policy upon chronic and transitory poverty in rural Pakistan. *The Journal of Development Studies*, 36(6), 100-130.
- McKinnon, R. I. (1977). *The eurocurrency market*. Princeton, New Jersey: International Finance Section, Department of Economics, Princeton University.
- Meyer, R. L., Nazma, S., & Cuevas, C. E. (1990). *The Determinants of Bank Deposit Variability: A Developing Country Case*. Economics and Sociological Occasional Paper Ohio State University. Department of Agricultural Economics and Rural Sociology. Retrieved from https://kb.osu.edu/dspace/bitstream/handle/1811/66201/1/CFAES_ESO_1692.pdf
- Miller, S., Hu, L., Kaestner, R., Mazumder, B., & Wong, A. (2019). How Health Insurance Improves Financial Health. *Chicago Fed Letter*
- Miller, S. M., & Noulas, A. G. (1996). The technical efficiency of large bank production. *Journal of Banking & Finance*, 20(3), 495-509.
- Mlachila, M., Cui, L., Jidoud, A., Newiak, M., Radzewicz-Bak, B., Takebe, M., . . . Zhang, J. (2016). *Financial development in Sub-Saharan Africa: Promoting inclusive and sustainable growth*. International Monetary Fund Washington, DC.
- Mondschean, T. S., & Opiela, T. P. (1999). Bank time deposit rates and market discipline in Poland: the impact of state ownership and deposit insurance reform. *Journal of Financial Services Research*, 15(3), 179-196.
- Moreira, M. J. (2003). A conditional likelihood ratio test for structural models. *Econometrica*, 71(4), 1027-1048.
- Murdeswar, M. L. (1970). Negotiable Certificate of Deposit: A New Monetary Instrument. *Economic and Political Weekly*, 1606-1608.
- Naraya, D., Patel, R., Schafft, K., Rademacher, A., & Koch-Schulte, S. (2000). *Can anyone hear us? Voices of the poor*: The World Bank.
- Newey, W. K., & West, K. D. (1994). Automatic lag selection in covariance matrix estimation. *The Review of Economic Studies*, 61(4), 631-653.
- Nier, E. W., & Merrouche, O. (2010). What caused the global financial crisis? Evidence on the drivers of financial imbalances 1999-2007. *IMF Working Papers*, 1-63.
- O'Cass, A., & Grace, D. (2004). Exploring consumer experiences with a service brand. *Journal of Product & Brand Management*, 13(4), 257-268.
- OCC, T. (n.d.). The Negotiable CD: National Bank Innovation in the 1960s. Retrieved 04 May 2019 from <https://www.occ.treas.gov/about/what-we-do/history/150th-negotiable-cd-article.html>

- Olivero, M. P., Li, Y., & Jeon, B. N. (2011). Competition in banking and the lending channel: Evidence from bank-level data in Asia and Latin America. *Journal of Banking & Finance*, 35(3), 560-571.
- Patrick, H. T. (1966). Financial development and economic growth in underdeveloped countries. *Economic Development and Cultural Change*, 14(2), 174-189.
- Pearson, A., & Triglione, N. (2020). Italian Lessons for U.S. Healthcare. *Skeptical Cardiologist*. Retrieved 29 Aug 2020
- Pickett, K. E., & Wilkinson, R. G. (2015). Income inequality and health: A causal review. *Social Science & Medicine*, 128, 316-326.
- Pilloff, S. J., & Rhoades, S. A. (2002). Structure and profitability in banking markets. *Review of Industrial Organization*, 20(1), 81-98.
- Pohl, M. (2017). *Basel III liquidity monitoring tools*. Bank of International Settlements: Bank of International Settlements. Retrieved from <https://www.bis.org/fsi/fsipapers14.pdf>
- Pradhan, K. C., & Mukherjee, S. (2018). Covariate and idiosyncratic shocks and coping strategies for poor and non-poor rural households in India. *Journal of Quantitative Economics*, 16(1), 101-127.
- Preston, S. H. (1980). Causes and consequences of mortality declines in less developed countries during the twentieth century. In *Population and economic change in developing countries* (pp. 289-360): University of Chicago Press.
- Preston, S. H., & Ho, J. Y. (2009). *Low life expectancy in the United States: Is the health care system at fault?* National Bureau of Economic Research.
- Pritchett, L., & Summers, L. H. (1993). *Wealthier is healthier* (Vol. 1150): World Bank Publications.
- Rajan, R. G. (1992). Insiders and Outsiders: The Choice between Informed and Arm's-Length Debt. *The Journal of Finance*, 47(4), 1367-1400.
- Rajan, R. G., & Zingales, L. (1998). Which capitalism? Lessons from the east Asian crisis. *Journal of Applied Corporate Finance*, 11(3), 40-48.
- Ramey, G., & Ramey, V. (1995). Cross & Country Evidence on the Link Between Volatility and Growth. *The American Economic Review*, 85(5), 1138-1151.
- Rangarajan, C. (1966). Deposit variability in individual banks. *National Banking Review*, 4, 61-71.
- Ranis, G., Stewart, F., & Ramirez, A. (2000). Economic growth and human development. *World Development*, 28(2), 197-219.
- Raudys, A., Lenčiauskas, V., & Malčius, E. (2013, 2013). *Moving averages for financial data smoothing*. Paper presented at the International Conference on Information and Software Technologies, Berlin, Heidelberg.
- Reed, W. R. (2015). On the practice of lagging variables to avoid simultaneity. *Oxford Bulletin of Economics and statistics*, 77(6), 897-905.
- Reid, M. (1982). *The secondary banking crisis, 1973-75: its causes and course*: Springer.
- Rhoades, S. A. (1995). Market share inequality, the HHI, and other measures of the firm-composition of a market. *Review of Industrial Organization*, 10(6), 657-674.
- Rioja, F., & Valev, N. (2004). Does one size fit all?: a reexamination of the finance and growth relationship. *Journal of Development Economics*, 74(2), 429-447.
- Roodman, D. (2009). A note on the theme of too many instruments. *Oxford Bulletin of Economics and statistics*, 71(1), 135-158.

- Roodman, D. (2018). XTABOND2: Stata module to extend xtabond dynamic panel data estimator. Retrieved from <https://EconPapers.repec.org/RePEc:boc:bocode:s435901>
- Rosen, H. S., & Wu, S. (2004). Portfolio choice and health status. *Journal of Financial Economics*, 72(3), 457-484.
- Rousseau, P. L. (2016). The Politics of Financial Development: A Review of Calomiris and Haber's Fragile by Design. *Journal of Economic Literature*, 54(1), 208-223.
- Schaeck, K., Cihak, M., & Wolfe, S. (2009). Are competitive banking systems more stable? *Journal of Money, Credit and Banking*, 41(4), 711-734.
- Schenk, C. R. (1998). The origins of the eurodollar market in London: 1955–1963. *Explorations in Economic History*, 35(2), 221-238.
- Schlueter, T., Sievers, S., & Hartmann-Wendels, T. (2015). Bank funding stability, pricing strategies and the guidance of depositors. *Journal of Banking & Finance*, 51(C), 43-61.
- Schooner, H. M., & Taylor, M. (1998). Convergence and Competition: The Case of Bank Regulation in Britain and the United States. *Michigan Journal of International Law*, 20(4), 595-655.
- Schularick, M., & Taylor, A. M. (2012). Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870-2008. *The American Economic Review*, 102(2), 1029-1061.
- Sekita, S. (2011). Financial literacy and retirement planning in Japan. *Journal of Pension Economics & Finance*, 10(4), 637-656.
- Self, S., & Grabowski, R. (2003). How effective is public health expenditure in improving overall health? A cross-country analysis. *Applied Economics*, 35(7), 835-845.
- Seltzer, L. H. (1940). The Problem of Our Excessive Banking Reserves. *Journal of the American Statistical Association*, 35(209), 24-36.
- Shaffer, S. (1989). Competition in the US banking industry. *Economics Letters*, 29(4), 321-323.
- Shih, K. H., Chang, C. J., & Lin, B. (2010). Assessing knowledge creation and intellectual capital in banking industry. *Journal of Intellectual Capital*, 11(1), 74-89.
- Shin, H. S. (2009). Reflections on Northern Rock: The bank run that heralded the global financial crisis. *Journal of Economic Perspectives*, 23(1), 101-119.
- Sinkey, J. F. J. (1992). *Commercial Bank Financial Management* (J. Lectka Ed. Vol. 4). Sydney: Maxwell MacMillan International
- Sirri, E., & Tufano, P. (1995). The economics of pooling, In: Bodie, Zvi, Crane, Dwight B., Froot, Kenneth, Mason, Scott, Merton, Roert C. and Perold, Andre F. (eds.) *The Global Financial System: A Functional Perspective*. In (pp. 81-128): Harvard Business School Press.
- Smith, B. D. (1984). Private information, deposit interest rates, and the 'stability' of the banking system. *Journal of Monetary Economics*, 14(3), 293-317.
- Song, F., & Thakor, A. V. (2010). Financial System Architecture and the Co-evolution of Banks and Capital Markets. *The Economic Journal*, 120(547), 1021-1055.
- Spierdijka, L., & Zaourasa, M. (2018). Measuring banks' market power in the presence of economies of scale: A scale-corrected Lerner index. *Journal of Banking & Finance*, 87(C), 40-48.
- Starr-McCluer, M. (1996). Health insurance and precautionary savings. *The American Economic Review*, 86(1), 285-295.
- Strauss, J., & Thomas, D. (1998). Health, nutrition, and economic development. *Journal of Economic Literature*, 36(2), 766-817.

- Streit, D., Lange, M., & Paul, S. (2016). *Determinants of Bank-Level Deposit Volatility: Evidence from the German Banking System*. Retrieved from <https://ssrn.com/abstract=2862034>
- Sun, A., & Yao, Y. (2010). Health shocks and children's school attainments in rural China. *Economics of Education Review*, 29(3), 375-382.
- Svirydzienka, K. (2016). *Introducing a new broad-based index of financial development*: International Monetary Fund.
- Syntetos, A. A., & Boylan, J. E. (2005). The accuracy of intermittent demand estimates. *International Journal of Forecasting*, 21(2), 303-314.
- Tadesse, S. (2002). Financial Architecture and Economic Performance: International Evidence. *Journal of Financial Intermediation*, 11(4), 429-454.
- Tan, C. H. (2005). *Financial markets and institutions in Singapore*: NUS Press.
- Tandon, A., Murray, C. J. L., Lauer, J. A., & Evans, D. B. (2000). Measuring overall health system performance for 191 countries. *Geneva: World Health Organization*
- Theilman, W. (1970). Commercial bank liability management and monetary control. *Journal of Financial and Quantitative Analysis*, 5(3), 329-339.
- Thomson, S., & Mossialos, E. (2006). Choice of public or private health insurance: learning from the experience of Germany and the Netherlands. *Journal of European Social Policy*, 16(4), 315-327.
- Todaro, M. P., & Smith, S. C. (2010). Human Capital: Education and Health in Economic Development. In *Economic Development* (11 ed.). England: Pearson Education Limited.
- Tortosa-Ausina, E. (2002). Bank cost efficiency and output specification. *Journal of Productivity Analysis*, 18(3), 199-222.
- UNDP. (2018). *Education Index*. United Nation Development Programme. Retrieved from <http://hdr.undp.org/en/content/education-index>
- Van Rooij, M., Lusardi, A., & Alessie, R. (2011). Financial literacy and stock market participation. *Journal of Financial Economics*, 101(2), 449-472.
- Vazquez, F., & Federico, P. (2015). Bank funding structures and risk: Evidence from the global financial crisis. *Journal of Banking & Finance*, 61(12), 1-14.
- Vives, X. (2001). Competition in the changing world of banking. *Oxford Review of Economic Policy*, 17(4), 535-547.
- Wagstaff, A. (2007). The economic consequences of health shocks: evidence from Vietnam. *Journal of Health Economics*, 26(1), 82-100.
- Wagstaff, A., & Lindelow, M. (2010). *Are health shocks different? Evidence from a multi-shock survey in Laos*: The World Bank.
- Wagstaff, A., & Van Doorslaer, E. (1992). Equity in the finance of health care: some international comparisons. *Journal of Health Economics*, 11(4), 361-387.
- Well, D. N. (2007). Accounting for the effect of health on economic growth. *The Quarterly Journal of Economics*, 122(3), 1265-1306.
- Wilkins, K., Gardner, G., & Chapman, B. (2016). *Developments in Banks' Funding Costs and Lending Rates*. Australia: Reserve Bank of Australia. Retrieved from <https://www.rba.gov.au/publications/bulletin/2016/mar/pdf/bu-0316-3.pdf>
- Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, 126(1), 25-51.
- Xiao, J. J. (1996). Effects of family income and life cycle stages on financial asset ownership. *Journal of Financial Counseling and Planning*, 7, 21.

- Xu, Z., & Li, H. (2008). Political freedom, economic freedom, and income convergence: Do stages of economic development matter? *Public Choice*, 135(3), 183-205.
- Yogo, M. (2016). Portfolio choice in retirement: Health risk and the demand for annuities, housing, and risky assets. *Journal of Monetary Economics*, 80, 17-34.
- Zhao, T., Casu, B., & Ferrari, A. (2010). The impact of regulatory reforms on cost structure, ownership and competition in Indian banking. *Journal of Banking & Finance*, 34(1), 246-254.
- Zins, A., & Weill, L. (2016). The determinants of financial inclusion in Africa. *Review of Development Finance*, 6(1), 46-57.

Appendix 1 List of countries

<i>Row Labels</i>	<i>High income</i>	<i>Lower middle income</i>	<i>Upper middle income</i>	<i>Grand Total</i>
East Asia & Pacific	3	4	2	9
Europe & Central Asia	25	2	3	30
Latin America & Caribbean	4		6	10
Middle East & North Africa	6	2	1	9
North America	2			2
South Asia		4		4
Sub-Saharan Africa		3	3	6
Grand Total	40	15	15	70

<i>Countries Name</i>	<i>Period covered</i>	
Argentina	2005	2015
Australia	2005	2015
Austria	2005	2015
Bangladesh	2005	2015
Belgium	2005	2015
Brazil	2005	2015
Bulgaria	2005	2013
Canada	2005	2015
Chile	2005	2015
Colombia	2005	2015
Croatia	2005	2015
Cyprus	2005	2015
Czech Republic	2005	2015
Denmark	2005	2012
Ecuador	2005	2012
Egypt, Arab Rep.	2005	2015
Estonia	2005	2012
Finland	2005	2012
France	2005	2015
Georgia	2005	2012
Germany	2005	2015
Ghana	2005	2013
Greece	2005	2015
Hungary	2005	2015
Iceland	2005	2012
India	2005	2015
Indonesia	2005	2015
Ireland	2005	2015
Israel	2005	2015
Italy	2005	2015
Jamaica	2005	2015

<i>Countries Name</i>	<i>Period covered</i>	
Japan	2005	2015
Jordan	2005	2015
Kenya	2005	2015
Kuwait	2005	2013
Latvia	2005	2012
Malaysia	2005	2015
Mauritius	2005	2015
Mexico	2005	2015
Mongolia	2005	2012
Morocco	2005	2015
Namibia	2005	2015
Netherlands	2005	2015
Nigeria	2005	2015
Norway	2005	2015
Oman	2005	2015
Pakistan	2005	2015
Panama	2005	2015
Peru	2005	2015
Philippines	2005	2015
Poland	2005	2015
Portugal	2005	2015
Qatar	2005	2015
Romania	2005	2015
Russian Federation	2005	2015
Saudi Arabia	2005	2015
Singapore	2005	2015
Slovenia	2005	2015
South Africa	2005	2015
Spain	2005	2015
Sri Lanka	2005	2015
Sweden	2005	2012
Switzerland	2005	2015
Thailand	2005	2015
Trinidad and Tobago	2005	2012
Ukraine	2005	2015
United Arab Emirates	2008	2015
United Kingdom	2005	2014
United States	2005	2015
Vietnam	2005	2015

Appendix 2 Human capital development: bank deposits (panel fixed effects method)

The table presents the results for 70 countries for the period of 2005-2015 using panel fixed effect method. Columns (1-4) present the results for deposit to GDP ratio, whereas columns (5-8) show the results for total deposit value of the country. All the variables are in natural log form except bank stability, inflation, education index, and economic freedom index. In all regression equations, I employ firm fixed and year effects. The robust standard errors are in parenthesis. The sign ***, **, and * present the statistical significance at 1%, 5% and 10% level respectively.

	(1) Deposit to GDP	(2) Deposit to GDP	(3) Deposit to GDP	(4) Deposit to GDP	(5) Deposit	(6) Deposit	(7) Deposit	(8) Deposit
PPCC	0.248***				0.274***			
	(0.0769)				(0.0792)			
PPCCGDP (%)		0.195**				0.397***		
		(0.0820)				(0.103)		
GE			0.0586				0.0985**	
			(0.0553)				(0.0412)	
GGEGDP (%)				0.452***				0.525***
				(0.0959)				(0.0976)
Education index	0.412	0.386	0.651	0.209	0.973	0.528	1.249	0.712
	(0.627)	(0.636)	(0.641)	(0.601)	(0.698)	(0.659)	(0.754)	(0.690)
OOPSUSD	0.116	0.131*	0.0897	0.0854	0.00921	0.0697	-0.0150	-0.0240
	(0.0803)	(0.0685)	(0.0806)	(0.0822)	(0.137)	(0.0978)	(0.134)	(0.135)
Inflation	0.00100	0.00128	0.000961	0.00160	-0.000961	-0.000116	-0.00101	-0.000249
	(0.00291)	(0.00263)	(0.00287)	(0.00292)	(0.00433)	(0.00366)	(0.00425)	(0.00416)
Bank Z	-0.0129**	-0.0118**	-0.0118**	-0.0106**	-0.0179***	-0.0163***	-0.0169**	-0.0153**
	(0.00490)	(0.00482)	(0.00515)	(0.00469)	(0.00672)	(0.00582)	(0.00696)	(0.00634)
Economic Freedom Index	0.0184***	0.0176***	0.0175***	0.0190***	0.0210***	0.0206***	0.0206***	0.0218***
	(0.00609)	(0.00606)	(0.00624)	(0.00571)	(0.00662)	(0.00647)	(0.00689)	(0.00629)
Income	-0.221	-0.429**	-0.270	-0.163	0.836***	0.415**	0.751***	0.904***
	(0.164)	(0.164)	(0.162)	(0.164)	(0.204)	(0.168)	(0.208)	(0.202)
Stock traded GDP	0.00174	0.00230	0.00178	0.00350	-0.0000614	0.00126	-0.000539	0.00200
	(0.0148)	(0.0155)	(0.0160)	(0.0148)	(0.0136)	(0.0134)	(0.0146)	(0.0137)
Constant	4.004***	4.502***	4.433***	2.405	15.53***	16.32***	16.08***	13.66***
	(1.390)	(1.368)	(1.346)	(1.477)	(1.538)	(1.412)	(1.535)	(1.652)
F	10.80	10.63	8.696	9.872	29.37	30.19	26.19	32.57
r ²	0.437	0.432	0.412	0.455	0.700	0.725	0.691	0.713
N	710	710	703	710	710	710	703	710

Appendix 3 Human capital development: bank deposits (first difference method)

The table presents the results for 70 countries for the period of 2005-2015 using first difference method. Columns (1-4) present the results for deposit to GDP ratio, whereas columns (5-8) show the results for total deposit value of the country. All the variables are in natural log form except bank stability, inflation, education index, and economic freedom index. In all regression equations, I employ firm fixed and year effects. The robust standard errors are in parenthesis. The sign ***, **, and * present the statistical significance at 1%, 5% and 10% level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	D.LDeposittoG DP	D.LDeposittoG DP	D.LDeposittoG DP	D.LDeposittoG DP	D.LDeposit	D.LDeposit	D.LDeposit	D.LDeposit
D.PPCC	0.298***				0.304***			
	(0.0443)				(0.0455)			
D.PPCCGDP (%)		0.287***				0.325***		
		(0.0466)				(0.0505)		
D.GE			0.120**				0.129***	
			(0.0508)				(0.0483)	
D.GGEGDP (%)				0.308***				0.318***
				(0.0762)				(0.0788)
D.Education index	0.302	0.302	0.195	0.331	0.320	0.314	0.202	0.360
	(0.476)	(0.486)	(0.560)	(0.597)	(0.485)	(0.485)	(0.569)	(0.602)
D.OOPSUSD	0.0375	0.0411	0.0292	0.0324	0.0254	0.0303	0.0163	0.0199
	(0.0381)	(0.0390)	(0.0383)	(0.0339)	(0.0368)	(0.0371)	(0.0368)	(0.0336)
D.Inflation	0.00259***	0.00261***	0.00217**	0.00272***	0.00231**	0.00242**	0.00188*	0.00246**
	(0.000945)	(0.000922)	(0.000981)	(0.000970)	(0.000988)	(0.000947)	(0.00103)	(0.00102)
D.Bank Z	-0.00258	-0.00242	-0.00167	-0.00148	-0.00289	-0.00295*	-0.00195	-0.00189
	(0.00174)	(0.00174)	(0.00185)	(0.00185)	(0.00181)	(0.00178)	(0.00195)	(0.00193)
D.Economic Freedom Index	0.00984***	0.00972***	0.00935***	0.00863***	0.0100***	0.0101***	0.00951***	0.00883***
	(0.00288)	(0.00290)	(0.00296)	(0.00260)	(0.00283)	(0.00286)	(0.00293)	(0.00261)
D.Income	-0.151	-0.424***	-0.316**	-0.179	0.780***	0.491***	0.605***	0.753***
	(0.148)	(0.150)	(0.143)	(0.135)	(0.148)	(0.150)	(0.146)	(0.132)
D.Stock traded GDP	0.00335	0.00354	0.00381	0.00331	0.00339	0.00344	0.00384	0.00327
	(0.00606)	(0.00609)	(0.00644)	(0.00639)	(0.00600)	(0.00598)	(0.00635)	(0.00633)
Constant	0.0311**	0.0269*	0.0338**	0.0350**	0.0477***	0.0420***	0.0502***	0.0515***
	(0.0145)	(0.0148)	(0.0145)	(0.0141)	(0.0146)	(0.0144)	(0.0146)	(0.0141)
N	638	638	631	638	638	638	631	638

Appendix 4 Human capital development: bank deposits (bank-based economies-2SLS)

The table presents the results for 43 countries representative of bank-based economies using 2SLS method for the period of 2005-2015. Columns (1-4) present the results for deposit to GDP ratio, whereas columns (5-8) show the results for total deposit value of the country. All the variables are in natural log form except bank stability, inflation, education index, and economic freedom index. I use bank stability, education index, per capital health expenditure as endogenous variables and the instrument variable for the same are lag-level variable of respective variables. In all regression equations, I employ firm fixed and year effects. The robust standard errors are in parenthesis. The sign ***, **, and * present the statistical significance at 1%, 5% and 10% level respectively.

	(1) Deposit to GDP	(2) Deposit to GDP	(3) Deposit to GDP	(4) Deposit to GDP	(5) Deposit	(6) Deposit	(7) Deposit	(8) Deposit
PPCC	0.210***				0.295***			
	(0.0648)				(0.0635)			
PPCCGDP (%)		0.266***				0.287***		
		(0.0696)				(0.0674)		
GE			0.0426*				0.0609***	
			(0.0224)				(0.0214)	
GGEGDP (%)				0.254***				0.333***
				(0.0966)				(0.0911)
Education index	1.600**	1.656**	1.842**	1.515*	1.940**	2.074***	2.325***	1.851**
	(0.802)	(0.787)	(0.856)	(0.806)	(0.788)	(0.790)	(0.873)	(0.794)
Bank Z	-0.0221***	-0.0211***	-0.0220***	-0.0186***	-0.0193***	-0.0182**	-0.0192**	-0.0146**
	(0.00740)	(0.00740)	(0.00763)	(0.00696)	(0.00744)	(0.00745)	(0.00766)	(0.00684)
OOPSUSD	0.258***	0.263***	0.250***	0.248***	0.268***	0.271***	0.256***	0.254***
	(0.0852)	(0.0845)	(0.0880)	(0.0863)	(0.0824)	(0.0830)	(0.0855)	(0.0840)
Stock traded GDP	0.0211	0.0218	0.0145	0.0123	0.0205	0.0184	0.0101	0.00820
	(0.0188)	(0.0179)	(0.0187)	(0.0180)	(0.0171)	(0.0166)	(0.0173)	(0.0165)
Inflation	-0.00162	-0.00163	-0.00111	-0.000992	-0.00122	-0.00100	-0.000338	-0.000331
	(0.00218)	(0.00217)	(0.00229)	(0.00222)	(0.00217)	(0.00220)	(0.00233)	(0.00227)
Income	-0.791***	-0.561***	-0.608***	-0.541***	0.224	0.550***	0.491***	0.575***
	(0.174)	(0.160)	(0.170)	(0.162)	(0.169)	(0.159)	(0.167)	(0.159)
Economic Freedom Index	0.0239***	0.0234***	0.0223***	0.0241***	0.0210***	0.0198***	0.0189***	0.0210***
	(0.00339)	(0.00330)	(0.00354)	(0.00332)	(0.00326)	(0.00323)	(0.00344)	(0.00320)
F	12.41	12.14	10.35	12.71	33.45	32.95	34.58	39.73
r ²	0.410	0.421	0.381	0.430	0.707	0.704	0.690	0.714
N	385	385	380	385	385	385	380	385

Appendix 5 Human capital development: bank deposits (market-based economies-2SLS)

The table presents the results for 27 countries representative of market-based economies using 2SLS method for the period of 2005-2015. Columns (1-4) present the results for deposit to GDP ratio, whereas columns (5-8) show the results for total deposit value of the country. All the variables are in natural log form except bank stability, inflation, education index, and economic freedom index. I use bank stability, education index, per capital health expenditure as endogenous variables and the instrument variable for the same are lag-level variable of respective variables. In all regression equations, I employ firm fixed and year effects. The robust standard errors are in parenthesis. The sign ***, **, and * present the statistical significance at 1%, 5% and 10% level respectively.

	(1) Deposit to GDP	(2) Deposit to GDP	(3) Deposit to GDP	(4) Deposit to GDP	(5) Deposit	(6) Deposit	(7) Deposit	(8) Deposit
PPCC	0.417*** (0.0795)				0.562*** (0.0843)			
PPCCGDP (%)		0.377*** (0.0890)				0.384*** (0.0972)		
GE			0.224*** (0.0796)				0.245*** (0.0857)	
GGEGDP (%)				0.727*** (0.123)				0.809*** (0.135)
Education index	-0.229 (0.699)	0.435 (0.666)	0.716 (0.684)	0.0885 (0.713)	0.541 (0.736)	1.758** (0.734)	1.990*** (0.758)	1.280 (0.783)
Bank Z	-0.0194 (0.0137)	-0.0210 (0.0149)	-0.0185 (0.0147)	-0.0126 (0.0129)	-0.0245 (0.0181)	-0.0259 (0.0198)	-0.0233 (0.0196)	-0.0168 (0.0177)
OOPSUSD	0.388*** (0.119)	0.259** (0.125)	0.262** (0.129)	0.127 (0.108)	0.176 (0.133)	-0.0230 (0.154)	-0.0143 (0.161)	-0.163 (0.134)
Stock traded GDP	0.0459 (0.0430)	0.0367 (0.0425)	0.0485 (0.0447)	0.0557 (0.0410)	0.00822 (0.0422)	0.00752 (0.0446)	0.0177 (0.0467)	0.0253 (0.0411)
Inflation	0.00319 (0.00311)	0.00117 (0.00335)	0.00117 (0.00339)	0.00104 (0.00291)	-0.00111 (0.00373)	-0.00413 (0.00440)	-0.00406 (0.00447)	-0.00419 (0.00386)
Income	-0.960*** (0.253)	-0.535** (0.238)	-0.756*** (0.265)	-0.231 (0.236)	-0.0784 (0.248)	0.477* (0.261)	0.238 (0.300)	0.821*** (0.260)
Economic Freedom Index	0.0168** (0.00671)	0.0198*** (0.00684)	0.0186*** (0.00698)	0.0126** (0.00573)	0.0257*** (0.00691)	0.0281*** (0.00715)	0.0272*** (0.00729)	0.0206*** (0.00613)
F	9.869	10.02	8.020	12.73	39.07	36.33	32.01	41.90
r ²	0.351	0.362	0.328	0.449	0.705	0.676	0.666	0.724
N	255	255	255	255	255	255	255	255

Appendix 6 Correlation matrix of full dataset

	DGDP	Deposit	Inflation	STK	PPCC	GEGDP	GE	PPCCGDP	OOPUSD	EFI	Income	EI	Bank Z	PS	GEFF	Voice	ROL	COC	
DGDP	1.00																		
Deposit	0.53	1.00																	
Inflation	-0.45	-0.37	1.00																
STK	0.51	0.74	-0.29	1.00															
PPCC	0.39	0.94	-0.36	0.65	1.00														
GEGDP	0.49	0.32	-0.35	0.20	0.44	1.00													
GE	0.61	0.46	-0.38	0.47	0.49	0.61	1.00												
PPCCGDP	0.52	0.41	-0.41	0.28	0.60	0.81	0.67	1.00											
OOPUSD	0.61	0.54	-0.47	0.43	0.58	0.62	0.79	0.68	1.00										
EFI	0.55	0.31	-0.40	0.42	0.29	0.24	0.61	0.45	0.66	1.00									
Income	0.60	0.54	-0.50	0.52	0.58	0.62	0.87	0.69	0.89	0.71	1.00								
EI	0.50	0.42	-0.40	0.31	0.52	0.67	0.68	0.78	0.80	0.61	0.80	1.00							
Bank Z	0.01	0.00	-0.09	0.12	-0.04	-0.08	0.11	-0.08	0.04	0.15	0.05	-0.16	1.00						
PS	0.55	0.21	-0.37	0.24	0.27	0.58	0.66	0.66	0.65	0.61	0.75	0.67	-0.03	1.00					
GEFF	0.72	0.50	-0.50	0.54	0.49	0.50	0.73	0.64	0.80	0.82	0.84	0.76	0.00	0.75	1.00				
Voice	0.48	0.36	-0.33	0.22	0.44	0.54	0.50	0.68	0.68	0.55	0.59	0.68	-0.21	0.59	0.71	1.00			
ROL	0.73	0.50	-0.48	0.53	0.49	0.55	0.73	0.66	0.79	0.81	0.84	0.75	0.00	0.78	0.96	0.72	1.00		
COC	0.68	0.47	-0.46	0.52	0.48	0.50	0.75	0.65	0.80	0.82	0.85	0.73	0.01	0.77	0.96	0.70	0.96	1.00	

Appendix 7 List of countries

Country Name	Income Classification	Region	Financially Develop Economies
Australia	High income	Asia	High
Hong Kong	High income	Asia	High
Japan	High income	Asia	High
New Zealand	High income	Asia	High
Singapore	High income	Asia	High
Austria	High income	Asia	High
Belgium	High income	Asia	High
Croatia	High income	Asia	High
Cyprus	High income	Asia	High
Czech Republic	High income	Asia	High
Denmark	High income	Asia	High
Estonia	High income	Asia	High
Finland	High income	Asia	High
France	High income	Asia	High
Germany	High income	Asia	High
Greece	High income	Asia	High
Hungary	High income	Asia	High
Ireland	High income	Asia	High
Italy	High income	Asia	High
Luxembourg	High income	Asia	High
Netherlands	High income	Asia	High
Norway	High income	Asia	High
Poland	High income	Asia	High
Portugal	High income	Asia	High
Slovakia	High income	Asia	High
Slovenia	High income	Asia	High
Spain	High income	Asia	High
Sweden	High income	Asia	High
Switzerland	High income	Asia	High
United Kingdom	High income	Asia	High
Latvia	High income	Asia	Low
Lithuania	High income	Asia	Low
United States	High income	America	High
Uruguay	High income	America	Low
Bahrain	High income	Africa	High
Israel	High income	Africa	High
Malta	High income	Africa	High
Kuwait	High income	Africa	Low
Oman	High income	Africa	Low
Qatar	High income	Africa	Low

Country Name	Income Classification	Region	Financially Develop Economies
Saudi Arabia	High income	Africa	Low
United Arab Emirates	High income	Africa	Low
China	Lower and Upper Middle Income	Asia	High
India	Lower and Upper Middle Income	Asia	High
Thailand	Lower and Upper Middle Income	Asia	High
Indonesia	Lower and Upper Middle Income	Asia	Low
Philippines	Lower and Upper Middle Income	Asia	Low
Armenia	Lower and Upper Middle Income	Asia	Low
Azerbaijan	Lower and Upper Middle Income	Asia	Low
Belarus	Lower and Upper Middle Income	Asia	Low
Bosnia And Herzegovina	Lower and Upper Middle Income	Asia	Low
Bulgaria	Lower and Upper Middle Income	Asia	Low
Kazakhstan	Lower and Upper Middle Income	Asia	Low
Republic Of Moldova	Lower and Upper Middle Income	Asia	Low
Romania	Lower and Upper Middle Income	Asia	Low
Russian Federation	Lower and Upper Middle Income	Asia	Low
Serbia	Lower and Upper Middle Income	Asia	Low
Turkey	Lower and Upper Middle Income	Asia	Low
Bolivia	Lower and Upper Middle Income	America	High
El Salvador	Lower and Upper Middle Income	America	High
Ecuador	Lower and Upper Middle Income	America	Low
Guatemala	Lower and Upper Middle Income	America	Low
Guyana	Lower and Upper Middle Income	America	Low
Mexico	Lower and Upper Middle Income	America	Low
Peru	Lower and Upper Middle Income	America	Low
Venezuela	Lower and Upper Middle Income	America	Low
Jordan	Lower and Upper Middle Income	Africa	High
Lebanon	Lower and Upper Middle Income	Africa	High
Algeria	Lower and Upper Middle Income	Africa	Low
Egypt	Lower and Upper Middle Income	Africa	Low
Tunisia	Lower and Upper Middle Income	Africa	Low
Botswana	Lower and Upper Middle Income	Africa	High
Mauritius	Lower and Upper Middle Income	Africa	High
Namibia	Lower and Upper Middle Income	Africa	High
South Africa	Lower and Upper Middle Income	Africa	High
Angola	Lower and Upper Middle Income	Africa	Low
Cameroon	Lower and Upper Middle Income	Africa	Low
Cote D'Ivoire	Lower and Upper Middle Income	Africa	Low
Ethiopia	Lower and Upper Middle Income	Africa	Low
Kenya	Lower and Upper Middle Income	Africa	Low
Madagascar	Lower and Upper Middle Income	Africa	Low

Country Name	Income Classification	Region	Financially Develop Economies
Malawi	Lower and Upper Middle Income	Africa	Low
Mali	Lower and Upper Middle Income	Africa	Low
Niger	Lower and Upper Middle Income	Africa	Low
Senegal	Lower and Upper Middle Income	Africa	Low
Swaziland	Lower and Upper Middle Income	Africa	Low
Uganda	Lower and Upper Middle Income	Africa	Low
Zambia	Lower and Upper Middle Income	Africa	Low

Appendix 8 Financial markets development: deposit funding and composition for all countries (panel fixed effects method)

The table reports coefficients and robust standard errors are in parentheses using panel fixed effect methods. Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportion as dependent variables. In all regression equations, I employ country fixed and year effects. The deposit funding and retail deposit proportion report the results for 88 countries, whereas time deposit proportion presents the result for 87 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Deposit Funding	Deposit Funding	Deposit Funding	Deposit Funding	Retail Deposit Proportion	Retail Deposit Proportion	Retail Deposit Proportion	Retail Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion
Interest Cost	0.0587 (0.0676)	0.0607 (0.0677)	0.0602 (0.0679)	0.0607 (0.0692)	0.518 (0.606)	0.511 (0.599)	0.522 (0.608)	0.520 (0.610)	0.648** (0.261)	0.653** (0.257)	0.645** (0.262)	0.647** (0.263)
Equity Capital	-0.602*** (0.155)	-0.586*** (0.160)	-0.601*** (0.156)	-0.584*** (0.155)	0.0665 (0.273)	0.0455 (0.271)	0.0976 (0.272)	0.0888 (0.275)	-0.0525 (0.533)	-0.0282 (0.538)	-0.0808 (0.530)	-0.0643 (0.526)
FMI	-6.715* (3.468)				-9.014 (10.46)				4.741 (14.30)			
FMD		-0.836 (3.866)				-15.58* (8.703)				11.75 (13.54)		
FME			-3.496* (1.902)				1.479 (3.973)				-2.908 (6.619)	
FMA				-2.846 (7.453)				-7.325 (13.22)				7.468 (11.57)
Inflation	-0.120*** (0.0413)	-0.123*** (0.0412)	-0.124*** (0.0405)	-0.121*** (0.0393)	-0.269 (0.187)	-0.266 (0.180)	-0.273 (0.187)	-0.267 (0.189)	-0.202 (0.304)	-0.203 (0.312)	-0.199 (0.304)	-0.206 (0.306)
GDP Growth	-0.0136 (0.0756)	-0.0244 (0.0777)	-0.0220 (0.0757)	-0.0231 (0.0770)	-0.547** (0.239)	-0.519** (0.237)	-0.566** (0.233)	-0.555** (0.238)	-1.101*** (0.267)	-1.128*** (0.276)	-1.085*** (0.264)	-1.099*** (0.266)
Economic Freedom Index	-0.151 (0.138)	-0.145 (0.136)	-0.146 (0.138)	-0.143 (0.138)	0.0843 (0.267)	0.0546 (0.262)	0.0976 (0.267)	0.0948 (0.266)	0.286 (0.383)	0.309 (0.380)	0.281 (0.382)	0.284 (0.385)
Constant	95.66*** (8.201)	93.20*** (7.840)	94.28*** (7.999)	93.72*** (9.588)	81.77*** (18.61)	86.08*** (17.93)	77.14*** (18.49)	80.24*** (18.76)	39.25 (26.68)	35.25 (26.35)	42.36 (26.18)	38.71 (26.46)
F	4.797	4.170	5.370	4.153	1.715	1.669	1.695	1.631	8.567	8.584	8.388	7.987
r ²	0.227	0.219	0.230	0.220	0.0946	0.101	0.0930	0.0941	0.230	0.233	0.231	0.231
N	772	772	772	772	762	762	762	762	761	761	761	761

Appendix 9 Financial markets development: deposit funding and composition (crisis effect for all countries- 2SLS)

The table reports coefficient and robust standard errors obtained through 2SLS are in parentheses. Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportion as dependent variables. In all regression equations, I employ country fixed and crisis effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lagged level variables as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion report the results for 88 countries, whereas time deposit proportion presents the result for 86 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Deposit Funding	(5) Retail Deposit Proportion	(6) Retail Deposit Proportion	(7) Retail Deposit Proportion	(8) Retail Deposit Proportion	(9) Time Deposit Proportion	(10) Time Deposit Proportion	(11) Time Deposit Proportion	(12) Time Deposit Proportion
Interest cost	0.0108 (0.0519)	-0.00494 (0.0535)	0.0181 (0.0516)	0.00516 (0.0549)	0.767* (0.421)	0.729* (0.409)	0.762* (0.419)	0.761* (0.418)	1.591*** (0.387)	1.679*** (0.409)	1.575*** (0.386)	1.628*** (0.407)
Equity Capital	-0.746*** (0.114)	-0.734*** (0.116)	-0.744*** (0.115)	-0.718*** (0.115)	0.229 (0.251)	0.185 (0.244)	0.238 (0.252)	0.244 (0.247)	-0.0773 (0.410)	-0.0843 (0.413)	-0.0972 (0.401)	-0.191 (0.411)
Crisis	-1.235** (0.495)	-1.664*** (0.489)	-1.223** (0.539)	-1.647*** (0.459)	-2.263** (0.978)	-2.000** (0.933)	-2.480** (1.072)	-2.543*** (0.980)	0.579 (1.010)	2.160** (0.983)	0.733 (1.065)	2.440** (1.021)
FMI	-9.437*** (3.147)				-5.975 (6.515)				41.91*** (8.012)			
FMD		-2.213 (3.166)				-21.56*** (6.702)				26.42*** (8.448)		
FME			-3.930*** (1.463)				-0.716 (3.300)				14.92*** (3.966)	
FMA				-7.654 (4.833)				-2.843 (8.998)				22.91*** (8.297)
Inflation	-0.150*** (0.0330)	-0.162*** (0.0340)	-0.152*** (0.0345)	-0.155*** (0.0335)	-0.243** (0.110)	-0.239** (0.104)	-0.249** (0.112)	-0.248** (0.112)	-0.0683 (0.178)	-0.0168 (0.179)	-0.0565 (0.178)	-0.0352 (0.179)
GDP Growth	-0.0846 (0.0541)	-0.107* (0.0563)	-0.0985* (0.0541)	-0.0996* (0.0541)	-0.232 (0.142)	-0.177 (0.139)	-0.248* (0.138)	-0.246* (0.139)	-0.527*** (0.137)	-0.482*** (0.141)	-0.458*** (0.132)	-0.430*** (0.133)
EFI	-0.140* (0.0802)	-0.119 (0.0768)	-0.127 (0.0794)	-0.113 (0.0796)	0.167 (0.193)	0.0814 (0.193)	0.184 (0.194)	0.185 (0.193)	0.190 (0.224)	0.171 (0.221)	0.119 (0.224)	0.0724 (0.224)
F	13.52	11.82	14.20	11.82	1.935	2.743	1.914	1.917	14.02	9.992	10.92	9.086
r ²	0.180	0.162	0.181	0.165	0.0486	0.0592	0.0467	0.0475	0.0953	0.0858	0.0899	0.0841
N	689	689	689	689	681	681	681	681	680	680	680	680

Appendix 10 Financial markets development: deposit funding and composition (crisis effect for high financially developed countries- 2SLS)

The table reports coefficient and robust standard errors obtained through 2SLS are in parentheses. Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportion as dependent variables. In all regression equations, I employ country fixed and crisis effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lagged level variables as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding, retail and time deposit proportions report the results for 45 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Deposit Funding	(5) Retail Deposit Proportion	(6) Retail Deposit Proportion	(7) Retail Deposit Proportion	(8) Retail Deposit Proportion	(9) Time Deposit Proportion	(10) Time Deposit Proportion	(11) Time Deposit Proportion	(12) Time Deposit Proportion
Interest Cost	-0.122 (0.138)	-0.132 (0.144)	-0.103 (0.136)	-0.149 (0.141)	-1.293*** (0.464)	-1.260*** (0.454)	-1.295*** (0.443)	-1.272*** (0.455)	2.370*** (0.864)	2.476*** (0.958)	2.322** (0.932)	2.646*** (0.969)
Equity Capital	-0.990*** (0.172)	-0.959*** (0.182)	-0.974*** (0.173)	-0.976*** (0.165)	0.271 (0.291)	0.325 (0.292)	0.217 (0.286)	0.205 (0.285)	0.323 (0.580)	0.261 (0.564)	0.134 (0.573)	0.217 (0.560)
FMI	-5.071 (4.097)				12.16 (8.062)				45.95*** (13.36)			
FMD		0.785 (5.185)				18.41** (8.611)				27.75** (12.08)		
FME			-2.187 (1.670)				1.981 (3.897)				10.46* (5.344)	
FMA				-2.986 (4.978)				-0.541 (7.524)				31.48*** (10.37)
Inflation	-0.491** (0.202)	-0.528*** (0.200)	-0.502** (0.201)	-0.504*** (0.187)	0.266 (0.418)	0.286 (0.410)	0.327 (0.409)	0.352 (0.427)	0.109 (0.479)	0.324 (0.492)	0.309 (0.489)	0.194 (0.512)
GDP Growth	-0.310*** (0.0811)	-0.341*** (0.0800)	-0.324*** (0.0787)	-0.322*** (0.0800)	0.104 (0.160)	0.0802 (0.168)	0.156 (0.161)	0.171 (0.158)	-1.188*** (0.225)	-1.079*** (0.229)	-1.008*** (0.222)	-1.108*** (0.233)
EFI	-0.345** (0.159)	-0.316** (0.148)	-0.344** (0.155)	-0.311** (0.146)	0.546* (0.299)	0.615** (0.305)	0.510* (0.303)	0.491* (0.284)	-0.568* (0.303)	-0.593* (0.310)	-0.672** (0.303)	-0.890*** (0.299)
Crisis	-1.611*** (0.473)	-1.880*** (0.434)	-1.556*** (0.488)	-1.852*** (0.393)	-0.688 (1.020)	-0.346 (0.921)	-0.353 (1.080)	-0.0674 (0.919)	0.288 (1.391)	2.206 (1.349)	1.128 (1.452)	2.443* (1.404)
F	19.63	19.65	19.76	19.14	2.075	2.540	2.016	2.067	10.72	9.490	9.166	9.078
r ²	0.284	0.274	0.285	0.274	-0.00425	0.00188	-0.00302	-0.00463	0.167	0.157	0.163	0.174
N	350	350	350	350	350	350	350	350	350	350	350	350

Appendix 11 Financial markets development: deposit funding and composition (crisis effect for less financially developed countries- 2SLS)

The table reports coefficient and robust standard errors obtained through 2SLS are in parentheses. Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportions as dependent variables. In all regression equations, I employ country fixed and crisis effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lag-level variable as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion report the results for 43 countries, whereas time deposit proportion presents the result for 41 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Deposit Funding	(5) Retail Deposit Proportion	(6) Retail Deposit Proportion	(7) Retail Deposit Proportion	(8) Retail Deposit Proportion	(9) Time Deposit Proportion	(10) Time Deposit Proportion	(11) Time Deposit Proportion	(12) Time Deposit Proportion
Interest Cost	0.0782* (0.0445)	0.0535 (0.0400)	0.0893* (0.0477)	0.0873* (0.0507)	0.984* (0.528)	0.909* (0.497)	0.999* (0.534)	1.000* (0.542)	1.589*** (0.418)	1.643*** (0.429)	1.557*** (0.412)	1.578*** (0.421)
Equity Capital	-0.540*** (0.105)	-0.554*** (0.112)	-0.569*** (0.111)	-0.431*** (0.0976)	0.350 (0.361)	0.310 (0.346)	0.305 (0.382)	0.540* (0.323)	-0.418 (0.493)	-0.388 (0.504)	-0.350 (0.486)	-0.631 (0.534)
FMI	-15.56*** (5.096)				-23.76** (9.669)				33.82*** (9.579)			
FMD		-7.654** (3.510)				-44.30*** (10.70)				17.25 (11.68)		
FME			-7.557*** (2.602)				-10.64* (6.076)				18.34*** (6.590)	
FMA				-23.49** (9.173)				-39.42* (23.91)				45.21** (20.16)
Inflation	-0.119*** (0.0307)	-0.136*** (0.0304)	-0.115*** (0.0320)	-0.116*** (0.0336)	-0.176 (0.109)	-0.203* (0.105)	-0.173 (0.114)	-0.170 (0.112)	-0.110 (0.189)	-0.0703 (0.189)	-0.127 (0.191)	-0.107 (0.191)
GDP Growth	0.0415 (0.0539)	0.0352 (0.0560)	0.0245 (0.0538)	0.0209 (0.0529)	-0.401** (0.194)	-0.299 (0.187)	-0.428** (0.190)	-0.431** (0.197)	-0.194 (0.170)	-0.178 (0.182)	-0.172 (0.164)	-0.132 (0.168)
EFI	0.0148 (0.0635)	0.0345 (0.0622)	0.0392 (0.0650)	-0.0301 (0.0688)	-0.141 (0.253)	-0.190 (0.264)	-0.0950 (0.263)	-0.228 (0.254)	0.784** (0.308)	0.748** (0.305)	0.720** (0.309)	0.881*** (0.337)
Crisis	0.738 (1.757)	0.626 (1.832)	0.138 (1.782)	0.407 (1.750)	-10.33*** (3.365)	-7.239** (3.205)	-11.28*** (3.465)	-10.75*** (3.368)	3.051 (3.437)	3.360 (3.439)	4.126 (3.309)	3.006 (3.746)
F	7.675	6.737	7.232	6.848	4.126	5.084	3.579	4.171	9.871	6.078	6.689	5.960
r ²	0.134	0.121	0.132	0.159	0.148	0.174	0.129	0.132	0.0886	0.0791	0.0883	0.0792
N	339	339	339	339	331	331	331	331	330	330	330	330

Appendix 12 Financial markets development: deposit funding and composition (deposit insurance for all countries- 2SLS)

The table reports coefficient and robust standard errors obtained through 2SLS are in parentheses. Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportion as dependent variables. In all regression equations, I employ country fixed and year effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lagged level variables as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion report the results for 64 countries, whereas time deposit proportion presents the result for 63 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Deposit Funding	(5) Retail Deposit Proportion	(6) Retail Deposit Proportion	(7) Retail Deposit Proportion	(8) Retail Deposit Proportion	(9) Time Deposit Proportion	(10) Time Deposit Proportion	(11) Time Deposit Proportion	(12) Time Deposit Proportion
Interest Cost	0.00836 (0.0651)	0.0177 (0.0661)	0.0136 (0.0649)	0.0178 (0.0671)	0.696 (0.488)	0.661 (0.477)	0.705 (0.489)	0.703 (0.490)	0.635** (0.293)	0.672** (0.291)	0.615** (0.294)	0.610** (0.296)
Equity Capital	-0.864*** (0.136)	-0.857*** (0.138)	-0.868*** (0.137)	-0.845*** (0.138)	-0.0985 (0.280)	-0.111 (0.274)	-0.0820 (0.283)	-0.0863 (0.272)	-0.309 (0.454)	-0.289 (0.459)	-0.324 (0.447)	-0.344 (0.445)
FMI	-6.139* (3.601)				-4.388 (8.409)				18.41* (11.13)			
FMD		0.558 (3.364)				-13.56* (7.155)				24.16*** (9.131)		
FME			-2.617 (1.673)				3.238 (3.318)				2.202 (6.039)	
FMA				-7.339 (5.126)				-4.267 (9.206)				6.554 (7.780)
Deposit Insurance	0.00623*** (0.00128)	0.00634*** (0.00129)	0.00629*** (0.00127)	0.00628*** (0.00128)	0.00443 (0.00290)	0.00425 (0.00290)	0.00452 (0.00290)	0.00445 (0.00289)	0.0175*** (0.00471)	0.0178*** (0.00467)	0.0172*** (0.00472)	0.0172*** (0.00472)
Inflation	-0.125*** (0.0342)	-0.131*** (0.0346)	-0.126*** (0.0351)	-0.123*** (0.0343)	-0.178* (0.0973)	-0.180* (0.0940)	-0.188* (0.0990)	-0.178* (0.0974)	-0.145 (0.188)	-0.125 (0.190)	-0.134 (0.186)	-0.137 (0.187)
GDP Growth	0.00265 (0.0577)	-0.0145 (0.0552)	-0.00656 (0.0561)	0.00305 (0.0582)	-0.0231 (0.130)	0.00496 (0.129)	-0.0424 (0.129)	-0.0251 (0.130)	-0.942*** (0.182)	-0.963*** (0.183)	-0.899*** (0.178)	-0.905*** (0.179)
EFI	-0.235*** (0.0836)	-0.225*** (0.0804)	-0.226*** (0.0843)	-0.227*** (0.0820)	0.259 (0.174)	0.207 (0.176)	0.264 (0.174)	0.265 (0.174)	0.0273 (0.192)	0.0984 (0.191)	0.00475 (0.190)	0.00786 (0.191)
F	8.595	8.388	9.230	8.466	2.000	2.270	1.903	1.912	17.80	17.96	17.48	17.16
r ²	0.230	0.232	0.235	0.234	0.0777	0.0916	0.0740	0.0758	0.291	0.292	0.293	0.294
N	608	608	608	608	600	600	600	600	599	599	599	599

Appendix 13 Financial markets development: deposit funding and composition (deposit insurance in highly financially developed countries-2SLS)

The table reports coefficient and robust standard errors obtained through 2SLS are in parentheses. Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportion as dependent variables. In all regression equations, I employ country fixed and year effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lagged level variables as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding, retail and time deposit proportions report the results for 37 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Deposit Funding	(5) Retail Deposit Proportion	(6) Retail Deposit Proportion	(7) Retail Deposit Proportion	(8) Retail Deposit Proportion	(9) Time Deposit Proportion	(10) Time Deposit Proportion	(11) Time Deposit Proportion	(12) Time Deposit Proportion
Interest Cost	0.328 (0.255)	0.364 (0.246)	0.350 (0.256)	0.327 (0.237)	-0.596 (0.558)	-0.856* (0.508)	-0.771 (0.516)	-0.905* (0.506)	2.052* (1.082)	1.646 (1.016)	1.646 (1.091)	1.729* (1.009)
Equity Capital	-1.081*** (0.181)	-1.069*** (0.184)	-1.074*** (0.179)	-1.091*** (0.171)	0.368 (0.284)	0.374 (0.277)	0.282 (0.277)	0.309 (0.271)	0.480 (0.591)	0.477 (0.585)	0.347 (0.579)	0.468 (0.575)
FMI	-2.120 (4.490)				26.29** (12.57)				39.36** (16.56)			
FMD		1.114 (5.754)				21.76** (10.47)				29.62** (13.68)		
FME			-0.271 (1.900)				6.384 (4.385)				4.938 (7.743)	
FMA				-3.683 (4.997)				7.368 (7.306)				27.35*** (9.249)
Deposit Insurance	0.00188 (0.00177)	0.00200 (0.00177)	0.00196 (0.00176)	0.00172 (0.00174)	-0.00496 (0.00423)	-0.00539 (0.00419)	-0.00585 (0.00399)	-0.00553 (0.00403)	-0.00182 (0.00742)	-0.00255 (0.00725)	-0.00328 (0.00712)	-0.00159 (0.00723)
Inflation	-0.417* (0.243)	-0.430* (0.238)	-0.426* (0.242)	-0.397* (0.235)	-0.365 (0.396)	-0.296 (0.387)	-0.260 (0.383)	-0.294 (0.386)	-0.444 (0.498)	-0.333 (0.478)	-0.268 (0.488)	-0.471 (0.491)
GDP Growth	-0.0939 (0.0960)	-0.102 (0.0908)	-0.0991 (0.0945)	-0.0822 (0.103)	-0.305* (0.182)	-0.308* (0.183)	-0.237 (0.187)	-0.276 (0.182)	-1.619*** (0.274)	-1.615*** (0.277)	-1.522*** (0.278)	-1.650*** (0.279)
EFI	-0.491*** (0.163)	-0.482*** (0.158)	-0.489*** (0.162)	-0.472*** (0.150)	0.774*** (0.261)	0.879*** (0.284)	0.751*** (0.259)	0.710*** (0.255)	-0.739*** (0.280)	-0.600** (0.301)	-0.778*** (0.280)	-0.912*** (0.285)
F	9.345	9.561	9.630	9.233	1.718	1.692	1.543	1.622	8.574	8.802	8.879	8.940
r ²	0.318	0.319	0.318	0.318	0.0847	0.0806	0.0828	0.0678	0.315	0.325	0.320	0.346
N	317	317	317	317	317	317	317	317	317	317	317	317

Appendix 14 Financial markets development: deposit funding and composition (deposit insurance in less financially developed countries-2SLS)

The table reports coefficient and robust standard errors obtained through 2SLS are in parentheses. Columns (1-4) present the result for deposit funding, whereas columns (5-12) show the results for bank deposit composition using retail and time deposit proportion as dependent variables. In all regression equations, I employ country fixed and year effects. I use interest cost, equity capital, and financial market indices as endogenous variable and their lagged level variables as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion report the results for 27 countries, whereas time deposit proportion presents the result for 26 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Deposit Funding	(5) Retail Deposit Proportio n	(6) Retail Deposit Proportio n	(7) Retail Deposit Proportio n	(8) Retail Deposit Proportio n	(9) Time Deposit Proportio n	(10) Time Deposit Proportio n	(11) Time Deposit Proportio n	(12) Time Deposit Proportio n
Interest Cost	-0.0490 (0.0534)	-0.0475 (0.0538)	-0.0310 (0.0548)	-0.0575 (0.0551)	0.682 (0.576)	0.623 (0.550)	0.739 (0.592)	0.612 (0.586)	0.420 (0.312)	0.439 (0.309)	0.435 (0.313)	0.408 (0.312)
Equity Capital	-0.536*** (0.148)	-0.560*** (0.160)	-0.591*** (0.160)	-0.370*** (0.134)	-0.282 (0.452)	-0.316 (0.471)	-0.427 (0.518)	0.482 (0.429)	-0.958* (0.582)	-0.983* (0.588)	-1.015* (0.592)	-0.732 (0.610)
FMI	-12.84** (5.587)				-45.48*** (12.26)				-10.10 (11.60)			
FMD		-3.888 (3.786)				-38.96*** (9.105)				4.900 (10.47)		
FME			-7.067** (3.054)				-7.181 (5.403)				-10.06 (7.191)	
FMA				-23.46** (10.66)				-100.0*** (24.33)				-28.76 (19.73)
Deposit Insurance	0.00888*** (0.00168)	0.00856*** (0.00176)	0.00895*** (0.00167)	0.00955*** (0.00171)	0.00966** (0.00426)	0.00821** (0.00399)	0.00873** (0.00412)	0.0134*** (0.00451)	0.0256*** (0.00533)	0.0255*** (0.00530)	0.0260*** (0.00531)	0.0264*** (0.00531)
Inflation	-0.0766** (0.0334)	-0.0914*** (0.0334)	-0.0753** (0.0353)	-0.0656* (0.0335)	-0.132 (0.101)	-0.176* (0.102)	-0.172 (0.107)	-0.0718 (0.111)	-0.152 (0.204)	-0.163 (0.205)	-0.137 (0.205)	-0.131 (0.209)
GDP Growth	0.101 (0.0641)	0.0792 (0.0618)	0.0925 (0.0623)	0.0922 (0.0589)	0.0859 (0.176)	0.0892 (0.170)	-0.0110 (0.174)	0.0741 (0.189)	-0.536** (0.225)	-0.582*** (0.226)	-0.516** (0.225)	-0.545** (0.220)
EFI	-0.00603 (0.0666)	0.000932 (0.0660)	0.0164 (0.0690)	-0.0614 (0.0701)	-0.0803 (0.234)	-0.0967 (0.240)	-0.00470 (0.240)	-0.370 (0.245)	0.856*** (0.269)	0.868*** (0.268)	0.891*** (0.270)	0.770*** (0.283)
F	4.172	3.831	4.236	4.688	3.491	3.576	3.002	3.170	10.74	9.901	10.10	9.602
r ²	0.194	0.192	0.191	0.225	0.207	0.245	0.184	0.189	0.301	0.301	0.298	0.302
N	339	339	339	339	331	331	331	331	330	330	330	330

Appendix 15 Correlation matrix of full dataset

	DF	RDP	TDP	IC	Capital	FMI	FMD	FMKE	FMA	Inflation	GDPG	EFI	DI	Crisis	RQ	GEFF
DF	1.00															
RDP	0.29	1.00														
TDP	0.05	0.02	1.00													
IC	-0.10	-0.08	0.26	1.00												
Capital	-0.29	0.11	0.11	0.07	1.00											
FMI	-0.22	-0.27	0.11	-0.13	-0.25	1.00										
FMD	-0.17	-0.27	0.08	-0.18	-0.27	0.95	1.00									
FMKE	-0.16	-0.21	0.12	-0.07	-0.18	0.84	0.72	1.00								
FMA	-0.24	-0.24	0.11	-0.08	-0.21	0.84	0.75	0.47	1.00							
Inflation	0.05	0.12	-0.05	0.30	0.21	-0.39	-0.38	-0.28	-0.36	1.00						
GDPG	0.10	0.18	0.01	0.07	0.23	-0.24	-0.23	-0.21	-0.20	0.32	1.00					
EFI	-0.25	-0.15	0.20	-0.13	-0.17	0.61	0.62	0.34	0.65	-0.48	-0.30	1.00				
DI	-0.01	0.00	0.09	0.00	0.00	0.09	0.05	0.14	0.05	-0.06	-0.03	-0.01	1.00			
Crisis	-0.15	-0.28	-0.01	-0.02	-0.17	0.35	0.34	0.31	0.27	-0.15	-0.31	0.24	-0.04	1.00		
RQ	-0.27	-0.23	0.16	-0.14	-0.27	0.71	0.70	0.49	0.69	-0.54	-0.39	0.88	-0.01	0.34	1.00	
GEFF	-0.25	-0.18	0.09	-0.16	-0.29	0.76	0.76	0.52	0.72	-0.51	-0.36	0.83	-0.01	0.32	0.95	1.00

Appendix 16 List of countries and number of banks according to financial development level

Country Name	Number of Banks	Financially Developed Economies	Region
Bahrain	6	High	Africa
Botswana	4	High	Africa
Israel	9	High	Africa
Jordan	10	High	Africa
Malta	4	High	Africa
Mauritius	8	High	Africa
Namibia	5	High	Africa
South Africa	8	High	Africa
Bolivia	6	High	America
El Salvador	6	High	America
United States of America	214	High	America
Australia	9	High	Asia
Austria	35	High	Asia
Belgium	12	High	Asia
China	10	High	Asia
Croatia	18	High	Asia
Cyprus	5	High	Asia
Czech Republic	12	High	Asia
Denmark	27	High	Asia
Estonia	3	High	Asia
Finland	4	High	Asia
France	60	High	Asia
Germany	71	High	Asia
Greece	6	High	Asia
Hong Kong	22	High	Asia
Hungary	10	High	Asia
India	43	High	Asia
Ireland	4	High	Asia
Italy	41	High	Asia
Luxembourg	28	High	Asia
Netherlands	12	High	Asia
New Zealand	5	High	Asia
Norway	6	High	Asia
Poland	13	High	Asia
Portugal	7	High	Asia
Singapore	7	High	Asia
Slovakia	6	High	Asia
Slovenia	10	High	Asia
Spain	13	High	Asia
Sweden	11	High	Asia

Country Name	Number of Banks	Financially Developed Economies	Region
Switzerland	77	High	Asia
Thailand	14	High	Asia
United Kingdom	54	High	Asia
Cameroon	5	Low	Africa
Cote D'Ivoire	4	Low	Africa
Ethiopia	6	Low	Africa
Kenya	17	Low	Africa
Kuwait	3	Low	Africa
Malawi	3	Low	Africa
Mali	3	Low	Africa
Oman	5	Low	Africa
Qatar	5	Low	Africa
Saudi Arabia	8	Low	Africa
Senegal	5	Low	Africa
Swaziland	4	Low	Africa
Tunisia	10	Low	Africa
Zambia	6	Low	Africa
Ecuador	12	Low	America
Guyana	2	Low	America
Peru	8	Low	America
Uruguay	10	Low	America
Armenia	9	Low	Asia
Azerbaijan	8	Low	Asia
Belarus	6	Low	Asia
Bosnia And Herzegovina	10	Low	Asia
Bulgaria	9	Low	Asia
Indonesia	37	Low	Asia
Kazakhstan	10	Low	Asia
Latvia	11	Low	Asia
Lithuania	6	Low	Asia
Philippines	15	Low	Asia
Republic of Moldova	8	Low	Asia
Romania	11	Low	Asia
Russian Federation	414	Low	Asia
Turkey	13	Low	Asia
Total Number of Banks	1618		

Appendix 17 Bank deposit competition and banking market structure: bank deposit funding and composition (all countries)

The table reports coefficient and robust standard errors obtained through 2SLS are in parentheses. Columns (1-3) present the result for bank deposit funding, whereas columns (4-9) show the results for bank deposit composition using retail deposit to total deposit and retail deposit to total retail deposit as dependent variables for all countries. In all regression equations, I employ firm fixed and year effects. I use interest cost, HHID3 and HHIL3 as endogenous variable and their lag-level variable as instrument variable. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion report the results for 49 countries, whereas time deposit proportion presents the result for 48 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) Deposit Funding	(2) Deposit Funding	(3) Deposit Funding	(4) Retail Deposit Proportion	(5) Retail Deposit Proportion	(6) Retail Deposit Proportion	(7) Time Deposit Proportion	(8) Time Deposit Proportion	(9) Time Deposit Proportion
Interest cost on total deposit	-0.391*** (0.139)	-0.435*** (0.144)	-0.478*** (0.154)	1.416*** (0.434)	1.422*** (0.434)	1.421*** (0.433)	3.700*** (0.484)	3.696*** (0.487)	3.715*** (0.489)
Interest cost on retail deposit	-0.330** (0.0220)	-0.321*** (0.0220)	-0.315*** (0.0221)	-0.367*** (0.0331)	-0.368*** (0.0331)	-0.368*** (0.0331)	0.0801 (0.195)	0.0806 (0.196)	0.0776 (0.195)
HHID3		-0.00209*** (0.000494)			0.000257 (0.000699)			-0.0000945 (0.00104)	
HHIL3			-0.00317** (0.000530)			0.000186 (0.000759)			0.000298 (0.00106)
Employee cost _{t-1}	-0.362 (0.233)	-0.397* (0.233)	-0.375 (0.231)	0.724*** (0.276)	0.728*** (0.277)	0.725*** (0.276)	1.747 (1.155)	1.740 (1.159)	1.764 (1.150)
Equity capital _{t-1}	-0.478*** (0.0347)	-0.480*** (0.0346)	-0.479*** (0.0344)	-0.0936** (0.0364)	-0.0933** (0.0364)	-0.0935** (0.0364)	-0.126 (0.0816)	-0.126 (0.0818)	-0.128 (0.0823)
Market Size _{t-1}	-0.318 (0.686)	-0.382 (0.687)	-0.296 (0.680)	-0.290 (0.700)	-0.283 (0.703)	-0.292 (0.700)	2.230 (1.567)	2.223 (1.567)	2.228 (1.564)
CPI	0.129*** (0.0387)	0.0383 (0.0445)	-0.0155 (0.0466)	-0.199** (0.0988)	-0.188* (0.105)	-0.191* (0.107)	-0.271*** (0.0980)	-0.273*** (0.101)	-0.263** (0.104)
GDP per capita	-3.993*** (0.815)	-5.573*** (0.833)	-6.608*** (0.884)	0.933 (1.336)	1.127 (1.370)	1.086 (1.420)	-13.03*** (2.171)	-13.13*** (2.556)	-12.74*** (2.600)
Financial Freedom	-0.0373* (0.0221)	-0.0131 (0.0225)	-0.00167 (0.0223)	-0.0934** (0.0328)	-0.0964** (0.0339)	-0.0955** (0.0339)	-0.0317 (0.0414)	-0.0302 (0.0465)	-0.0359 (0.0455)
Population Old	2.619*** (0.297)	2.061*** (0.304)	1.973*** (0.301)	-0.467 (0.447)	-0.399 (0.469)	-0.429 (0.459)	-0.441 (0.689)	-0.442 (0.691)	-0.452 (0.687)
F	73.50	71.81	74.01	14.82	13.96	13.95	10.11	9.510	9.565
r ²	0.319	0.325	0.327	0.141	0.141	0.141	0.143	0.143	0.143
N	6101	6101	6101	6101	6101	6101	3495	3495	3495

Appendix 18 Bank deposit competition and banking market structure: bank deposit funding and composition (interest on retail deposits- highly financially developed economies)

The table reports coefficient and robust standard errors obtained through 2SLS are in parentheses. Columns (1-3) present the result for bank deposit funding, whereas columns (4-9) show the results for bank deposit composition using retail deposit to total deposit and retail deposit to total retail deposit as dependent variables for high financially developed economies. In all regression equations, I employ firm fixed and year effects. I use interest cost, equity capital, employee cost, market size, HHID3 and HHIL3 as endogenous variable and their lag-level variable as instrument variable, except for market concentration (HHID3 and HHIL3). For market concentration, I employ Financial Institution Access Index as an instrument. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding, retail and time deposit proportions presents the result for 31 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Deposit Funding	Deposit Funding	Deposit Funding	Retail Deposit Proportion	Retail Deposit Proportion	Retail Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion
Interest cost on total deposit	-0.195 (0.249)	-0.217 (0.245)	-0.214 (0.247)	0.199 (0.361)	0.217 (0.360)	0.216 (0.361)	4.363*** (0.537)	4.342*** (0.535)	4.335*** (0.537)
Interest cost on retail deposit	0.402*** (0.139)	0.413*** (0.138)	0.405*** (0.139)	-0.533*** (0.134)	-0.543*** (0.135)	-0.536*** (0.134)	-0.0278 (0.203)	-0.0234 (0.202)	-0.0270 (0.203)
HHID3		0.00159** (0.000627)			-0.00134 (0.000915)			0.000986 (0.00133)	
HHIL3			0.00127* (0.000698)			-0.00118 (0.00103)			0.00124 (0.00147)
Employee cost t_{-1}	0.165 (0.603)	0.168 (0.609)	0.131 (0.607)	5.009*** (1.200)	5.006*** (1.194)	5.040*** (1.197)	0.0801 (1.728)	0.114 (1.722)	0.0828 (1.722)
Equity capital t_{-1}	-0.646*** (0.0647)	-0.635*** (0.0649)	-0.641*** (0.0646)	0.173* (0.0987)	0.164* (0.0985)	0.169* (0.0985)	-0.205 (0.126)	-0.202 (0.125)	-0.203 (0.125)
Market Size t_{-1}	0.240 (0.712)	0.354 (0.702)	0.258 (0.704)	-3.711** (1.529)	-3.808** (1.519)	-3.729** (1.517)	1.907 (2.311)	1.964 (2.283)	1.918 (2.278)
CPI	-0.268*** (0.0948)	-0.233** (0.0973)	-0.266*** (0.0951)	0.243 (0.158)	0.214 (0.160)	0.242 (0.158)	-0.112 (0.204)	-0.0995 (0.205)	-0.117 (0.204)
GDP per capita	-5.149*** (0.959)	-3.247*** (1.162)	-3.614*** (1.212)	0.730 (1.801)	-0.871 (2.065)	-0.702 (2.156)	-17.07*** (2.855)	-15.88*** (3.528)	-15.57*** (3.719)
Financial Freedom	-0.0583*** (0.0215)	-0.0939** (0.0249)	-0.0761*** (0.0230)	-0.0124 (0.0387)	0.0176 (0.0431)	0.00426 (0.0410)	-0.101* (0.0554)	-0.120* (0.0638)	-0.118** (0.0598)
Population Old	-0.138 (0.382)	0.250 (0.405)	0.0433 (0.391)	1.151* (0.614)	0.825 (0.659)	0.982 (0.637)	-1.229 (0.897)	-1.088 (0.926)	-1.141 (0.906)
F	18.78	17.68	17.78	5.570	5.330	5.278	10.52	10.37	10.65
r ²	0.150	0.154	0.153	0.0860	0.0875	0.0864	0.0820	0.0843	0.0846
N	2871	2871	2871	2871	2871	2871	2591	2591	2591

Appendix 19 Bank deposit competition and banking market structure: bank deposit funding and composition (interest on retail deposits- less financially developed economies)

The table reports coefficient and robust standard errors obtained through 2SLS are in parentheses. Columns (1-3) present the result for bank deposit funding, whereas columns (4-9) show the results for bank deposit composition using retail deposit to total deposit and retail deposit to total retail deposit as dependent variables for less financially developed economies. In all regression equations, I employ firm fixed and year effects. I use interest cost, equity capital, employee cost, market size, HHID3 and HHIL3 as endogenous variable and their lag-level variable as instrument variable, except for market concentration (HHID3 and HHIL3). For market concentration, I employ Financial Institution Access Index as an instrument. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The deposit funding and retail deposit proportion show results for 18 countries and time deposit proportion consists 17 countries. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Deposit Funding	Deposit Funding	Deposit Funding	Retail Deposit Proportion	Retail Deposit Proportion	Retail Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion	Time Deposit Proportion
Interest cost on total deposit	-0.415** (0.181)	-0.519** (0.202)	-0.558*** (0.214)	1.731*** (0.597)	1.748*** (0.600)	1.720** (0.591)	3.845*** (0.566)	3.739*** (0.561)	3.744*** (0.547)
Interest cost on retail deposit	-0.353*** (0.0222)	-0.327*** (0.0221)	-0.327*** (0.0222)	-0.377*** (0.0356)	-0.381*** (0.0357)	-0.375*** (0.0353)	0.372 (0.539)	0.354 (0.536)	0.347 (0.536)
HHID3		-0.00579*** (0.000787)			0.000961 (0.00118)			-0.00202 (0.00196)	
HHIL3			-0.00598*** (0.000701)			-0.000450 (0.00116)			-0.00184 (0.00179)
Employee cost t_{-1}	-0.390 (0.264)	-0.460* (0.263)	-0.420 (0.261)	0.696** (0.279)	0.708** (0.280)	0.694** (0.279)	4.034*** (1.458)	3.884*** (1.442)	3.926*** (1.431)
Equity capital t_{-1}	-0.461*** (0.0396)	-0.460*** (0.0394)	-0.460*** (0.0390)	-0.115*** (0.0389)	-0.115*** (0.0388)	-0.115*** (0.0389)	0.0192 (0.0973)	0.0280 (0.0965)	0.0288 (0.0975)
Market Size t_{-1}	-0.176 (0.913)	-0.355 (0.913)	-0.203 (0.897)	1.037 (0.812)	1.067 (0.817)	1.035 (0.813)	2.900 (1.771)	2.774 (1.779)	2.980* (1.759)
CPI	0.114*** (0.0428)	-0.129** (0.0551)	-0.177*** (0.0562)	-0.152 (0.122)	-0.111 (0.131)	-0.174 (0.137)	-0.421*** (0.122)	-0.458*** (0.125)	-0.475*** (0.135)
GDP per capita	-1.796 (1.998)	-2.797 (2.005)	-4.192** (1.986)	-0.647 (2.730)	-0.480 (2.674)	-0.827 (2.673)	4.648 (3.931)	3.197 (4.538)	3.302 (4.446)
Financial Freedom	-0.0175 (0.0457)	-0.0233 (0.0441)	0.0153 (0.0450)	-0.0292 (0.0725)	-0.0283 (0.0726)	-0.0268 (0.0732)	-0.124 (0.0828)	-0.107 (0.0863)	-0.104 (0.0884)
Population Old	5.117*** (0.695)	3.950*** (0.655)	4.224*** (0.672)	1.282 (0.912)	1.476 (0.913)	1.215 (0.907)	-0.665 (1.288)	-0.119 (1.317)	-0.0778 (1.387)
F	72.86	74.63	76.05	17.35	16.51	16.24	10.56	10.99	10.39
r ²	0.407	0.430	0.430	0.237	0.237	0.236	0.321	0.327	0.327
N	3230	3230	3230	3230	3230	3230	904	904	904

Appendix 20 Interaction- High income countries, Interest cost, HHID, and HHIL

The table reports coefficient and robust standard errors obtained through 2SLS are in parentheses. Columns (1-3) present the result for bank deposit funding, whereas columns (4-9) show the results for bank deposit composition using retail deposit to total deposit and retail deposit to total retail deposit as dependent. In all regression equations, I employ firm fixed and year effects. I use interest cost, equity capital, employee cost, market size, HHID3, HHIL3, and the interaction between HHID, HHIL and interest cost as endogenous variable and their lag-level variable as instrument variable, except for market concentration (HHID3 and HHIL3). For market concentration, I employ Financial Institution Access Index as an instrument. The Stock-Wright test confirms the validity of instruments. Moreover, Hansen-J test suggest that none of the regressions results has over-identification issue. The ***, **, and * denote statistical significance at the 1, 5, and 10 percent level respectively.

	(1) DF	(2) DF	(3) DF	(4) RDP	(5) RDP	(6) RDP	(7) TDP	(8) TDP	(9) TDP
Interest cost (IC)	-2.4996*** (0.191)	-3.3653*** (0.265)	-3.3554*** (0.280)	2.8861*** (0.299)	2.4675*** (0.357)	3.2111*** (0.452)	6.4408*** (0.484)	2.1432*** (0.811)	3.2765*** (0.883)
Capital	-0.8101*** (0.028)	-0.8245*** (0.028)	-0.8229*** (0.029)	-0.2301*** (0.057)	-0.2492*** (0.057)	-0.2268*** (0.057)	0.1913 (0.122)	0.1417 (0.130)	0.1455 (0.130)
High Income (HI)	12.5752*** (1.736)	15.8202*** (1.830)	15.8037*** (1.938)	52.3517*** (3.269)	40.4364*** (3.319)	47.2557*** (3.655)	27.8094*** (4.257)	15.6677*** (4.497)	23.4049*** (5.043)
Salary	-1.4467*** (0.227)	-1.4368*** (0.228)	-1.4298*** (0.228)	-0.2973 (0.353)	-0.1663 (0.367)	-0.2222 (0.367)	-2.9649*** (0.862)	-3.9264*** (0.875)	-4.0989*** (0.857)
HHID3		-0.0032*** (0.001)			0.0157*** (0.002)			-0.0081*** (0.002)	
HHIL3			-0.0037*** (0.001)			0.0235*** (0.003)			-0.0025 (0.003)
HI*IC	1.0869*** (0.367)			-6.3170*** (0.752)			-3.9520*** (0.612)		
HI*HHID		-0.0009 (0.001)			-0.0113*** (0.002)			-0.0039** (0.002)	
HI*HHIL			-0.0007 (0.001)			-0.0183*** (0.002)			-0.0092*** (0.003)
IC*HHID		0.0012*** (0.000)			-0.0019*** (0.000)			0.0010** (0.000)	
IC*HHIL			0.0013*** (0.000)			-0.0027*** (0.000)			0.0003 (0.000)
Inflation	0.0204 (0.150)	-0.0913 (0.130)	-0.1868 (0.115)	-1.8245*** (0.264)	-1.2767*** (0.269)	-1.1581*** (0.268)	-0.1566 (0.236)	0.4629** (0.210)	0.4109* (0.215)
Income	-5.2573*** (0.478)	-5.2561*** (0.470)	-5.4735*** (0.474)	-12.7135*** (0.899)	-9.0074*** (0.946)	-8.2043*** (0.964)	0.3657 (1.238)	2.1695 (1.335)	1.3674 (1.351)
FF	0.0963*** (0.025)	0.0991*** (0.025)	0.1033*** (0.026)	0.3157*** (0.046)	0.2424*** (0.047)	0.2037*** (0.049)	0.3267*** (0.055)	0.3043*** (0.052)	0.3036*** (0.053)
Size	-0.9948*** (0.192)	-1.1288*** (0.187)	-1.1550*** (0.187)	0.3669 (0.270)	0.4618* (0.277)	0.5631** (0.282)	-0.2586 (0.388)	-0.9127*** (0.349)	-0.7974** (0.347)
Population Old	-0.8858*** (0.091)	-0.7791*** (0.090)	-0.7796*** (0.090)	-2.0226*** (0.177)	-1.9665*** (0.182)	-1.8278*** (0.180)	-2.0795*** (0.206)	-1.7717*** (0.186)	-1.6604*** (0.190)
F	178.6701	178.1946	181.3032	125.5946	97.6281	96.4530	31.5661	34.8692	34.6830
r2	0.5439	0.5576	0.5574	0.4566	0.4348	0.4269	0.1712	0.2636	0.2778
N	12929.0000	12929.0000	12929.0000	12858.0000	12858.0000	12858.0000	8632.0000	8632.0000	8632.0000

Appendix 21 Correlation matrix of full dataset

Variables' Name	DF	RDP	TDP	IC	ICR	It-1	STAT-1	CAPt-1	MSt-1	HHID	HHIL	CPI	PCI	OP	FF	RQ	PS	GE	ROL
DF	1.00																		
RDP	0.62	1.00																	
TDP	-0.41	-0.50	1.00																
IC	-0.40	-0.22	0.38	1.00															
ICR	-0.48	-0.47	0.33	0.28	1.00														
It-1	-0.40	-0.25	0.42	0.75	0.26	1.00													
STA t-1	-0.48	-0.44	0.40	0.23	0.30	0.51	1.00												
CAP t-1	-0.54	-0.36	0.30	0.03	0.21	0.25	0.45	1.00											
MS t-1	0.49	0.50	-0.51	-0.30	-0.35	-0.52	-0.67	-0.55	1.00										
HHID	0.26	0.31	-0.50	-0.20	-0.20	-0.28	-0.32	-0.21	0.34	1.00									
HHIL	0.23	0.26	-0.50	-0.16	-0.18	-0.25	-0.29	-0.20	0.30	0.98	1.00								
CPI	-0.37	-0.39	0.42	0.54	0.24	0.62	0.46	0.30	-0.53	-0.28	-0.23	1.00							
PCI	0.04	-0.02	-0.05	-0.37	-0.05	-0.43	-0.18	-0.12	0.25	0.11	0.08	-0.54	1.00						
OP	-0.20	-0.29	0.01	-0.15	0.06	-0.19	0.04	0.01	-0.03	-0.03	-0.02	-0.23	0.67	1.00					
FF	0.41	0.41	-0.38	-0.48	-0.30	-0.57	-0.46	-0.28	0.52	0.36	0.32	-0.69	0.61	0.28	1.00				
RQ	0.40	0.37	-0.36	-0.50	-0.28	-0.61	-0.47	-0.31	0.56	0.34	0.29	-0.73	0.76	0.42	0.90	1.00			
PS	0.37	0.36	-0.43	-0.43	-0.27	-0.52	-0.43	-0.28	0.47	0.45	0.42	-0.63	0.68	0.40	0.76	0.85	1.00		
GE	0.42	0.39	-0.34	-0.50	-0.28	-0.62	-0.48	-0.31	0.57	0.34	0.29	-0.71	0.74	0.36	0.85	0.97	0.81	1.00	
ROL	0.46	0.44	-0.39	-0.50	-0.31	-0.63	-0.51	-0.34	0.61	0.36	0.31	-0.72	0.71	0.32	0.86	0.96	0.84	0.98	1.00