

Effects of financial markets development on the bank deposits mix: a cross-country analysis

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Abstract

This paper examines the effects of the financial markets on banks' deposit mix in developed and developing economies using two-step and one-step sys-GMM estimators. Our empirical results provide evidence that investors in developed and developing economies use financial markets differently. Therefore, the effects of the financial markets on the bank deposit mix also varies in these two types of economies. We find that, in developed countries, financial markets are an alternative investment channel to time deposits for investors and works as a competitor for the banking sector. On the contrary, in developing countries, due to lower financial inclusion, the financial markets and the banking sector are complementary to each other and they grow together. Therefore, we recommend that policymakers of developing countries should work closely with both to attract savers into the financial system and improve the financial inclusion level. Our results suggest that interest rate is the key factor in attracting time deposit in developed countries. Thus, the banks need to use it wisely to increase the volume of time deposits.

Keywords: Bank Deposits, Financial Development, Liquidity Management, Bank Stability, Interest Rates, Financial Markets, Banking System

JEL Classification: E21, E44, G21, O16, O43, O57

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1. Introduction

The financial structure of a country broadly consists of two main types of systems: market-based and bank-based systems (Beck, Demirgüç-Kunt, & Levine, 2010; Levine, 2002). The market-based systems are based on the financial markets, which includes equity markets, bond markets, money markets, and derivative market, among others. Generally, the development of financial markets depends on a robust banking system. Moreover, both systems, in general, provide an investment channel to surplus holders (Allen & Carletti, 2010). Hence, they compete with each other by offering differing yields, better services and as such, due to which most economists consider the two systems competing for the same goal of fund mobilisation (Hubbard & O'Brien, 2012; Rajan, 1992). However, the level of competition between banks and the financial markets depends on the level of financial inclusion in the country. If financial inclusion is high, most people will have access to a 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 time deposits offered by banks (Gilkeson, List, & Ruff, 1999; Gurley & Shaw, 1955).

On the other hand, if financial inclusion is low, both systems have the opportunity to attract new savers, who do not currently use a formal banking system. In current regulatory environment, it is essential to have a bank account to invest in financial markets⁴. There are several studies on the effects of the financial system on economic growth (Beck et al., 2010; Hubbard, 2007; Levine, 1997, 2002). There are studies comparing bank-based and market-based systems, in regard to their influence on economic growth (Allen, Chui, & Maddaloni, 2007; Levine, 2002). However, to the best of our knowledge, there is a very limited literature on how financial market development affects the banking system.

⁴ Investment in financial markets- Before buying a stock from a stock market, we need three types of accounts viz. bank, demat, and trading accounts. Investors need to transfer money from their bank accounts to trading accounts through cheque or online to buy a stock.

This paper examines how the financial markets of selected developed and developing economies have influenced the banks deposit mix over the period 2005-2016. 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, we used stock-turnover and market capitalization value for measuring the liquidity and investors' interest in financial markets. To understand the incentives for investors to invest in the stock market, we also used PE ratio and interest cost on deposits as control variables in the model. .

According to our findings, financial markets of the developed economies work as a competitor to banking systems whereas in the developing economies, they complement each other and they provide growth opportunity to both systems. Demirguc-Kunt, Klapper, Singer, Ansar, and Hess (2018) showed that about 94 percent of people in developed economies have access to the formal financial system. This goes down to approximately 63 percent in low or middle-income countries. Thus, in developing countries, both systems have a higher opportunity to attract savers and grow together.

This paper considers bank-specific factors such as the interest rates, the salary expenditure, and the stability of banks as determinants of the bank deposit mix and are used as control variables. Moreover, some macroeconomic factors also influence households' saving decisions. Thus, we have used the gross domestic product of a country as a control variable. We used the difference between the 10-year bond rates and the 3-month bill rates as a control variable to derive the yield curve. Because, it is worth investigating the effect of the Global Financial Crisis (GFC), we included the time dummies for the GFC period. Our results show that, apart from interest rates, all other control variables, except salary, have a negative relationship with time deposits in the developing countries.

The paper is organized in the following manner. Section 2 discusses the existing literature on financial markets and the banking system, and other important variables such as deposit pricing, capital, salary, and shape of the yield curve. Section 3 explains data collection, methodology, and preliminary analysis. The empirical findings and their policy implications are included in section 4, and followed by conclusions and the scope for further research in section 5.

2. Literature review

There have been numerous studies on the comparison between the effects of bank-based and market-based financial system on the economic growth. The literature on financial development is divided into two broader categories i.e. bank-based and market-based view. Economists who support the bank-based system argue that banks play an important role in acquiring information related to firms and managers, improving the capital allocation, and eventually aiding in economic growth (Arestis, Demetriades, & Luintel, 2001; Diamond, 1984; Levine, 1998, 2002). Rajan and Zingales (1998) highlighted the benefits of relationship based funding (bank-based system) in East Asia. They state that a dominant banking system creates a good relationship with firms and can enforce firms to repay loans in the weaker regulatory environment.

On the other hand, those economists favoring 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 to increase the growth rate of the economy (Allen & Santomero, 1997; Greenwood & Smith, 1997; Levine, 1997; 1995). Tadesse (2002) found 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) showed that strong financial market or development of the banking system lead to a higher growth rate of 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) found the variation in the effects of financial development on economic growth, as per the income level of the countries. They found a strong and positive effect of financial development on economic growth in middle-income countries, which vanishes as the country reaches to high-income category. Similarly, Cecchetti and Kharroubi (2012) found a “U” shape relationship between financial development and economic growth. They stated that there is a point in the financial development, when the financial sector negatively affects economic growth. Moreover, Arcand, Berkes, and Panizza (2015) stated that once private credit to GDP ratio crosses the range of 80-120, it reduces the economic growth. The relationship between economic growth and 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 that create competition amongst financial intermediaries (financial market and banking system). However, due to the difference in characteristics between the systems, investors and borrowers prefer one or another, according to their requirements, expectations, and status. New borrowers or start-up companies prefer borrowings from banks, whereas high reputational firms go to the general public for funding (Diamond, 1991). Similarly, Bolton and Freixas (2000) argue that large and safe firms like to finance their needs through the equity market or bond market, whereas distressed or risky firms approach banks.

In the same way, from the investment side, investors with high risk-appetite are willing to invest their money in the capital market, whereas low risk-appetite investors prefer banks for investment. Guiso and Sodini (2013) stated that households' needs and expectations determine their choice of financial products and financial intermediaries. They also argued that the institutional and regulatory environment shape the financial decisions of households. Similarly Bordo, Redish, and Rockoff (2015) stated that due to a poor banking system at the time of industrial revolution, financial markets became important in the US economy. Thus, the economic situation, regulatory environment, and investors' behavior determine their choice of one system to another. Therefore, in any country we find use of one system more in use than the other system. Allen and Carletti (2010) identified that the dominance of one financial system over another varies globally, such as in the US investors holding a large amount of equity and bond in comparison to Japan. This difference in households' saving decisions and usage of the financial system determine the bank deposit mix. To influence households' savings decisions, both systems compete with each other by offering higher yields and/or services.

The financial inclusion level of the country determines the level of competition between the financial markets and the banking system. A lower level of financial inclusion provides an opportunity for financial markets and banking system to grow together. In a way, these two systems are complementary to each other in developing countries (Demirgüç-Kunt & Maksimovic, 1998). Song and Thakor (2010) showed three forms of relationship between banks and financial market viz. competition, co-evolution, and complementarity. However, their study focused on the borrowing side of the banks. To the best of our knowledge, there is a limited study on the effects of financial market on bank-deposit mix. This paper, therefore, focuses on how financial markets shape the banking system, especially the bank-deposit mix in developed and developing countries.

In the following sections, we will be discussing the literature on bank-specific factors, which determines the deposit mix of banks.

2.1 Interest rate

According to Hutchison and Pennacchi (1996), the interest rate is one of the primary factors of allocating households savings to bank deposits. Deposits in transaction accounts are mainly for precautionary purposes or alternative ways to keep liquid cash in hand, and these deposits are less interest rate sensitive compared to non-transactions accounts. Banks offer higher interest rates on time deposits to attract retail depositors for long-term investments, driving competition in the banking system for time deposits (De Graeve, De Jonghe, & Vander Vennet, 2007). The deregulation of interest rates allowed banks to offer higher interest rates, which created the competition in the financial system (Bayoumi, 1993). According to Holmes (1972) interest rates deregulation increased the proportion of time deposits from 14 percent (1965) to 35 percent (1971) in New Zealand. In the year 1965, banks were allowed to offer higher interest rates for the maturity period 24 months; hence almost 100 percent of time deposits had maturity period within 24 months. Once, the regulation relaxed, banks witnessed a sharp rise in the proportion of time deposits having a maturity period more than 24 months. This clearly indicates that interest rates defines the households' savings decision in time deposits. Hence, banks use interest rates as one of the tools to fulfill the funding requirements (Hubbard, 2007; Tobin, 1958).

Burger (1971); Flannery and James (1984) also found a positive relationship between the interest rates on time deposit and the volume of time deposits. Moreover, they found a negative relationship between the yield on other financial instruments and movement of time deposits. Thus, interest rates and stock market return have a negative correlation. In today's economic environment, when most developed countries have effective financial markets, banks face difficulty in attracting time deposits. Therefore, banks increase interest rates to attract

more time deposits that reduce profitability and makes the bank more fragile (Egan, Hortaçsu, & Matvos, 2017). However, to the best of our knowledge, there is no study on the interrelationships among interest rates, time deposits, and financial market development. Therefore, it would be useful to identify the relationship between interest rates and time deposit in the light of stock market development and stock market return.

2.2 Capital

Banks need both short-term and long-term funds to operate. The sources of long-term funds are capital and retail deposits, especially time deposits. Due to the competition from the financial market and orientation of higher profitability over stability, most banking systems are face issues in acquiring long-term deposits, which increases the risk of banks. Therefore, regulators are increasing the capital requirements to make the banks more stable (Horváth, Seidler, & Weill, 2014; Kim & Santomero, 1988; Koehn & Santomero, 1980).

Diamond and Rajan (2000) showed a model, in which they considered deposits (demand deposits) as a fragile source of funding. Therefore, in the case of a bank run, capital provides stability to the bank. Martinez Peria and Schmukler (2001) found a negative relationship between deposit growth, capital and bank runs and a positive relationship between interest rates increase and bank crises. In the regulatory environment, capital is always considered a saviour from the financial crisis (Demirguc-Kunt, Detragiache, & Merrouche, 2010). However, the GFC showed that the prevailing capital regulation regime was not effective enough to curb the financial crisis (Repullo & Suarez, 2008). This led regulators and economists around the globe to impose more stringent capital norms for banks (Aikman, Bridges, Kashyap, & Siergert, 2018; Demirguc-Kunt et al., 2010). Anginer, Demirgüç-Kunt, and Mare (2018) state that capital is a good strategic tool to curb the systemic risk in a poor regulatory environment. Most researchers studied the effects of capital on the stability and profitability of the firm. Moreover, in the banking context, it is also necessary to study the

effect of the stability of banks on bank deposits. In this study, we used capital as a source of the stability of the banks and identified the effect of the same on bank deposit mix in developed and developing countries context.

2.3 Service quality

Quality of service is one of the most powerful tools that differentiates the firm in the industry and gives it a competitive advantage (Nguyen & Leblanc, 2001). High-quality service creates a brand image for the firm. Customers rely on the quality of the corporate brands for high-quality services and products. The importance of the services varies from one industry to another such as service firms are more dependent on the corporate image to acquire market share than manufacturing firms are, due to the comparative ease in imitating the services. Van, Cornelius, and Puth (1995) state that bank managers should spend more time building corporate image by improving their corporate behavior and identity. Therefore, service firms, such as banks, make consistent efforts in building their corporate images by providing efficient and effective services to their customers (Berry, 2000). Furthermore, Egan et al. (2017) note that if the quality of service declines, depositors withdraw their money which severely impacts the financial stability of the banks.

De Chernatony and Cottam (2006) examined the importance of quality of employees and their attitude in creating differences in the brand image of the organization. Professionalism and kind behavior of employees make a huge difference in customers' experiences, which facilitates the strategic development of the company (Avkiran, 1994; Julian & Ramaseshan, 1994; O'Cass & Grace, 2004). Additionally, De Chernatony (1999) highlights the importance of knowledge about the brand value to employees in their study. Murphy (1985) found a strong relationship between firms' performance and managerial compensation. Moreover, Trevor, Gerhart, and Boudreau (1997) found a negative relationship between salary growth and employees' turnover and stated that compensation to employees is the fundamental way to

retain top performers in an organisation. Hence, salary to employees is one of the critical factors in improving the firm performance and acquiring the market share. Therefore, we consider salary expenditure one of the determining factors of bank deposit mix.

2.4 Shape of the Yield Curve

Before investing for long-term, investors observe the shape of the yield curve (Campbell, 1995). For immediate or precautionary reasons, investors prefer security of the fund to earnings. On the other hand, for retirement and/or for the long-term needs, they prefer investing in high yielding financial instruments. Moreover, due to the risk aversion behaviour, investors prefer financial instruments that offer risk and term premium (Cox, Ingersoll, & Ross, 1985). Thus, in normal economic situation, we find yield curve upward sloping or a positive spread between long-term bond rate and short-term bills rate. However, we can also find other types of yield curve such as downward sloping, hump or trough shape (Campbell, 1995).

Weber (1970) argued that increment in interest rates allows investors maintaining their consumption in future by investing less today and hence, increases the current consumption level. However, this is only in the case for rises in real interest rates. On the contrary, Reinhart and Végh (1995) found negative relationship between nominal interest rates and consumption level. In the absence of risk premium or term premium, the shape of the yield curve is either flat or downward sloping, which deters investors to save for the long-term and induce investors to consume. Hence, we included this as a control variable in our model.

This paper finds that the effects of stock market development on the bank deposit mix vary according to the economic development level of the countries. We find that the stock market is an alternative destination for investment of funds in developed countries in general, hence, both, the stock market and the bank deposit mix, have a negative relationship. However, in developing countries, due to a lower level of financial inclusion, both systems are

complementing to each other and growing together. Hence, we find a positive relationship between these two systems in the developing countries. We used control variables such as salary expenditures, capital, and interest cost on deposits as bank-specific factors. We also use shape of the yield curve, the number of commercial bank branches per 100,000 population, and gross domestic product as control variables for macroeconomic factors.

3. Data collection and methodology

The main problem of this study is the lack of the availability of data related to bank deposit mix. To the best of our knowledge, no database provides the break-up of deposit base of banks. Hence, we relied on banks' financial statement to construct this dataset. We selected eight countries representing developed (Australia, Canada, New Zealand, and USA), and for countries as developing (Indonesia, India, Malaysia, and Pakistan) economies. Australia, Canada, New Zealand, and the USA operate on an Anglo-Saxon banking model. Therefore, the banking models of these countries are similar and comparable with each other. In preliminary data analysis we found that the stock market of New Zealand has limited liquidity, but we still consider New Zealand in our study because of its liberal investment rules and regulation for the investors (FIRB, 2015). Moreover, the banking system of developing countries are similar to each other and they follow similar set of rules for liquidity management such as the reserve requirements (SLR and CRR). In addition, these countries are also culturally similar to each other.

According to Table 1, we collected data of four (4) banks of each Australia and New Zealand, which covers a total of 75 and 84 percent of market share respectively in Year 2016. In the North American region, we targeted top eight (8) banks of USA⁵ and five (5) banks of

⁵ We dropped some of the largest banks (such as Morgan Stanley, BNY Mellon, among others) mainly because of the two reasons: first their global presence and second, they were investment banks.

Canada, which cover 51 percent and 85 percent of market share respectively. Moving to the developing countries in the East Asian region, we collected data for the top seven (7) and six (6) banks from the annual reports of the banks of India and Pakistan respectively. We also collected data of the top six (6) and five (5) banks of Indonesia and Malaysia covering the market share of 55 percent and 89 percent respectively from the Asia-Pacific region. Thus, we collected data of total 47 banks spanning the period from 2005 to 2016. The summary of the data collection is shown in table 1.

Table 1

Countries	Number of Banks	Market Share (Year)
Developed Countries		
Australia	4	75 % (2016)
Canada	5	85% (2016)
New Zealand	4	84% (2016)
USA	8	51% (2016)
Developing Countries		
Indonesia	6	55% (2015)
India	8	59% (2016)
Malaysia	5	85% (2016)
Pakistan	7	53% (2016)

We collected the data related to the deposit mix, interest cost, salary expenditure, net-worth of the shareholders, and the total assets from the consolidated annual financial statements of the respective banks. The data on the GDP and the number of commercial bank branches per 100,000 population have been collected from the World Bank’s database. The price-earnings ratios (PE) of each country were collected from the DataStream, and the yields for 10-year bonds and 3-months bills rate have been collected from the “Global Financial Database”.

The retail deposits have been divided into two parts i.e. transaction accounts and non-transaction accounts. Non-transaction accounts have a certain maturity date, and these attract a penalty on withdrawal of funds before maturity. In the annual reports, these deposits are generally mentioned as time deposits and/or certificate of deposits (CDs). In contrast,

transaction accounts are volatile in nature and there is no or limited restrictions on withdrawal of funds from the deposit. Moreover, such deposits do not have maturity date. These deposits are generally described as saving deposits, demand deposits, or transactions deposits, among others, in annual reports.

Interest costs are interest expenditure on the total deposits considering both retail and banking and financial services deposit of respective banks. We have used the ratio of salary expenditure of banks to the total bank-deposits to identify the effect of service quality on the bank deposit mix. The stability of the firm also influences the investors' decisions on savings. In order to identify the effect of stability of the banks on the bank deposit mix, we have used the capital to total assets ratio as an indicator for bank stability (Berger, Klapper, & Turk-Ariss, 2009).

The notation and expected signs of the variables are shown below in table 2.

Table 2

Variable	Notation	Measure	Expectation
<i>Dependent Variable</i>			
Deposit Mix	LNTATD	Log of Non-transaction accounts (Time Deposits)/Total Deposit	
<i>Bank Specific Factors:</i>			
Price of deposits	LIC	Log of Interest expenses/Total Deposits	Positive
Price of Labour	LSDP	Log of Salary/Total Deposit	Positive
Stability of the firm	LCAP	Log of Shareholders' fund/Total Assets	Positive
<i>Financial Market:</i>			
Public interest in the stock market	LSTK	Log of Stock-turnover value	Negative
Public interest in the stock market	LMCAP	Log of Market Capitalization Value	Negative
Return of stock market	LPE	Log of Price-Earnings of market	Negative
<i>Macroeconomic Factors:</i>			
Countries' economic performance	LGDP	Log of Gross Domestic Product (GDP)	Positive
Commercial Bank Branching	LCBB	Log of number of commercial bank branches per 100,000 population	Positive
The shape of Yield Curve	DFY10Y3M	Difference between 10-year bond yield and 3-month bill rate	Positive

It is generally suggested that taking the logarithm of ratio is meaningless. However, we are using two different sets of countries, and we found skewness in our datasets. The log-log model will be therefore useful in handling this issue (Wooldridge, 2013).

3.1 Methodology

The summary statistics of the variables of the entire dataset, and two subgroups viz. developed and developing economies are given in table 3 below.

Table 3

Name of the Variables	No. of Observations	Mean	SD	Min	Max
All Countries					
LNTATD	563	3.67	0.60	1.09	4.36
LIC	564	0.84	0.96	-2.63	2.33
LSDP	564	0.40	0.46	-0.81	2.53
LCAP	564	-2.52	0.35	-3.45	-1.56
LSTK	564	26.59	2.81	20.11	31.49
LPE	564	2.82	0.34	1.48	4.11
DFY10Y3M	564	0.89	1.23	-2.68	4.10
LGDP	564	27.62	1.53	25.42	30.56
LCBB	564	2.81	0.59	1.66	3.58
Developing Countries					
LNTATD	312	3.80	0.49	1.76	4.36
LIC	312	1.19	0.56	-0.77	2.17
LSDP	312	0.31	0.46	-0.81	2.52
LCAP	312	-2.46	0.34	-3.45	-1.56
LSTK	312	25.41	1.75	20.11	27.77
LPE	312	2.74	0.35	1.48	3.31
DFY10Y3M	312	0.82	1.08	-1.21	4.10
LGDP	312	26.95	0.92	25.42	28.45
LCBB	312	2.33	0.28	1.66	2.89
Developed Countries					
LNTATD	251	3.51	0.69	1.10	4.35
LIC	252	0.40	1.16	-2.63	2.33
LSDP	252	0.52	0.43	-0.59	2.34
LCAP	252	-2.59	0.35	-3.26	-1.78
LSTK	252	28.05	3.18	21.37	31.49
LPE	252	2.92	0.30	2.37	4.11
DFY10Y3M	252	0.98	1.40	-2.68	3.78
LGDP	252	28.45	1.73	25.44	30.56
LCBB	243	3.42	0.144	3.13	3.58

We are examining the relationship between the financial developments as defined earlier and the bank deposit mix in developed and developing economies. There are various factors which indicate the financial development level of the country such as market capitalization to GDP, stock-turnover to GDP, and the number of listed domestic companies (Beck & Demirguc-Kunt, 2009). Most studies consider the stock market capitalization to GDP ratio as a key indicator of the development level of the financial market. On the other hand, Levine and Zervos (1999) showed that stock turnover to GDP ratio is a better predictor of the development of the financial system than market capitalization to GDP ratio. We used both the stock-turnover and the market capitalization value as key indicators of the financial development level of a country.

We use the PE ratio of the market for identifying the effects of the yield from financial markets on the bank deposit mix, since investors usually compare the earnings from bank deposit products with the market yield before making investment decisions. We also believe that other variables such as the employee costs, stability of the firm, the GDP, shape of the yield curve, and the number of bank branches in the country affect the bank deposit mix. Therefore, we included these variables as control variables. We also included the dummy variable for the GFC period to identify the effects of the same on the bank deposit mix.

Expecting to observe an autocorrelation effect with the dependent variable, we conducted the autocorrelation test on the dependent variable (non-transaction accounts to total deposits) and identified a significant relationship between the dependent variable and the first lag of the dependent variable. This suggests a dynamic characteristics for the dataset. We further conducted the Hausman test to assess the choice between the random and fixed, and the results suggest the analysis should not have fixed effects. We also checked the stationarity of the panel data by using the unit root test suggested by Im, Pesaran, and Shin (2003). We could not find any statistically significant result at the first level difference.

We conducted Breusch-Pagan, Cook-Weisberg test and the White test to identify if data is homoscedastic or heteroscedastic. The result was in the favour of heteroscedasticity of the dataset. We were expecting to have multicollinearity amongst variables such as interest cost, capital, and salary expenditure. We therefore conducted a variance inflation factors (VIF) test, but could not find a multicollinearity issue in the dataset. This prompted us to use all the variables.

As per the autocorrelation test, the data show dynamic characteristics and the Hausman (1978) test supports a fixed effect model. We therefore used lagged dependent variable as an explanatory variable. The fixed effect model on the least squares method presents spurious results, involving autocorrelation issues with the dependent variable (Judson & Owen, 1999). Therefore, we are using sys-GMM to address the issue of autocorrelation and heteroscedasticity.

It is usual practice to use dynamic panel data when the dependent variable and some of the explanatory variables are correlated to their past values. This is likely to be the case in studying the effects of financial markets on the bank deposit mix. Arellano and Bond (1991) proposed the first difference GMM method to obtain the efficiency and consistency by using lagged value of the dependent variables and using the same as exogenous or instrument variables. Yet, this method was criticized by Blundell and Bond (2000) when the lagged value of capital and employment are weakly correlated. They proposed an extended sys-GMM model, which helps to overcome the problem of weak instruments. The sys-GMM uses two simultaneous equations viz. first, instruments for the first difference and second, instruments for the level equation. Furthermore, we relied on the two-step sys-GMM estimator, since it provides consistent estimates in the presence of heteroscedasticity and serial correlation (Çoban & Topcu, 2013). Nevertheless, we also present the output of the one-step estimator to compare the results. Moreover, we used the finite sample correction to the two-step covariance matrix

developed by Windmeijer (2005) which makes the two-step GMM estimator more robust than the one-step (Roodman, 2015). However, even the sys-GMM is not foolproof; it has certain limitations such as the usage of too many instruments. To circumvent this situation, we used the collapse function to combine instruments into smaller sets (Roodman, 2009). Hence we present four regression results in each dataset, with two-step and one-step estimators, and with stock market value and market capitalization value as key variables.

We used the lag of the dependent variable, interest cost of deposit, salary expenditures, and capital as endogenous variables. We had an issue of determining whether the stock-turnover value and PE ratio were exogenous or endogenous variables. We created four scenarios; first, we used both as exogenous variables, second as endogenous variables, and in third and fourth scenarios, we used one of them as an endogenous and another one as an exogenous variable. We replicated these scenarios in all three datasets. We find that these variables provide consistent results while using as exogenous variables.

The sys-GMM model has another issue of inclusion of too many instruments. This issue we found when we included the year effects in our model. Hence, we excluded the year effect and controlled only for GFC years. However, the results were broadly consistent in both the cases (see year effect results in Appendix 1, 2, & 3). We also conducted Sargan and Hansen- J test to explore the validity of a full set of instruments. However, the Sargan test is valid only if the standard errors are homoscedastic, which is highly unlikely in our case (Roodman, 2009). Therefore, we present only the Hansen-J test results in our output.

At first, the model has been applied on a full cross-country dataset to identify the determining factors of bank deposit mix across countries. Then, we replicated the same model in two other datasets viz. for the developed and the developing economies.

$$Y_{cbt} = \beta_0 + v_c + \theta_c + Y_{cbt-1} + Y_{cbt-2} + \sum_{g=1}^G \beta_g X_{bct}^g + \sum_{m=1}^M \beta_m X_{bct}^m + \sum_{e=1}^E \beta_e X_{bct}^e + \varepsilon_{cbt} \dots \dots (1)$$

Where Y_{cbt} is the ratio of non-transaction accounts to total deposits (deposit mix) of bank b at a time t and of country c . Y_{cbt-1} is lag of one year of deposit mix of a bank. v_c consists the bank's fixed effects; θ_c -country fixed effects. X_{bct}^g is the bank-specific factors such as interest cost; employee cost; and financial stability of the firm (capital to total assets ratio). X_{bct}^m represents stock-turnover value; PE ratio of the country. X_{bct}^e indicates the log of GDP of each country; log of commercial bank branching per 100,000 population; and shape of the yield curve. ε - denotes disturbance or error term.

3.2 Preliminary analysis

We conducted a preliminary analysis using pooled OLS regression model on all three datasets with the same variables. The main variables such as stock turnover value, market capital value, the PE ratio of the countries, and the stock turnover value showed the positive statistically significant relationship using all countries and developing countries' datasets, but not in developed countries context (see Appendix 4). Moreover, we found the statistically significant negative relationship between market capitalization value and the bank deposit mix in all countries context, but not in developed and developing countries' contexts. Thus, the OLS results suggest that the stock market development and the bank deposit mix are positively related, which is in line with the main results. However, we cannot infer the relationship between the stock market development and the bank deposit mix in developed countries using both the market capitalization and the stock turnover values. The negative relationship between market capitalization and the bank deposit mix in all countries contexts suggest that as the stock

market price goes up, investors shift their funds in more secured investment products.

The PE ratio showed the same positive direction and statistically significant consistent results in all countries and developed economies' contexts. In developing countries context, the relationship was negative in both scenarios but statistically significant only with stock-turnover value as the key variable. The other control variables such as the shape of the yield curve, the gross domestic products (GDP), and GFC showed consistent and similar results as main regressions. Thus, the pooled OLS model results are broadly consistent in terms of the direction of relationship with main models.

The direction of relationship and significance level of other control variables such as interest cost on deposits, bank stability, and the service quality of banks (salary to deposit ratio) are broadly consistent with the main results. The interest cost on deposit has strong positive relationship with the time deposits in the all country and the developed countries' datasets. On the other hand, we could not find a significant relationship among service quality, bank stability, and bank deposit mix in all three datasets.

4. Empirical findings and policy implications

The model seems quite robust for all three datasets in both techniques: two-steps and one-step. The results show largely stable coefficients for most variables. The Wald-test and Hansen-J test show goodness of fit of data reflecting no over-identifying restriction in the models. The autocorrelation at first level (AR-1) shows negative results whereas second (AR - 2) level shows positive results. However, AR (1) is significant and rejecting the null hypothesis at 5 percent level and AR (2) could not reject the null hypothesis, which are the key requirements for showing the consistency of the model (Arellano & Bond, 1991).

Table 5

All Countries-System GMM-Model (1)				
	Two-step	One-step	Two-Step	One-Step
	(1)	(2)	(3)	(4)
Lag of Deposit Mix ^a	0.785*** (0.104)	0.817*** (0.103)	0.821*** (0.0940)	0.829*** (0.109)
Interest cost ^a	0.122*** (0.0345)	0.124*** (0.0324)	0.107*** (0.0328)	0.128*** (0.0386)
Capital Cost ^a	-0.0257 (0.0681)	0.0137 (0.0515)	-0.0659 (0.0586)	-0.0191 (0.0544)
Salary Expenditure ^a	-0.185*** (0.0653)	-0.0709 (0.0902)	-0.150*** (0.0615)	-0.0477 (0.0884)
Stock Turnover Value ^a	0.0356*** (0.0163)	0.0475*** (0.0145)		
Market Capitalization ^a Value			0.0111 (0.0276)	0.0442 (0.0508)
Price-earnings ratio ^a	0.0889*** (0.0405)	0.0715** (0.0404)	0.0855*** (0.0370)	0.0524 (0.0455)
Gross Domestic Product ^a	-0.0486 (0.0310)	-0.0839*** (0.0347)	-0.00561 (0.0378)	-0.0520 (0.0670)
Difference between 10-Year and 3-Month bill rate ^b	-0.0133** (0.00743)	-0.00753 (0.00739)	-0.0110 (0.00686)	-0.00835 (0.00727)
GFC ^b	-0.0480*** (0.0177)	-0.0489*** (0.0200)	-0.0285*** (0.0142)	-0.0196 (0.0136)
Constant	0.862 (0.752)	1.482** (0.796)	0.0813 (0.592)	0.570 (0.843)
Observations	516	516	516	516
No. of instruments	18	18	18	18
AR1 (p-value)	0.000738	0.000469	0.000675	0.000653
AR2 (p-value)	0.0932	0.0732	0.0743	0.0679
Hansen-J (p-value)	0.261	0.261	0.379	0.379

Standard errors in parentheses

** $p < 0.10$, *** $p < 0.05$;

a- The variables are in log form

b- The variables are without log.

Table 5 above displays before the results of model one using the two-step and one-step sys-GMM with stock-turnover value and market capitalization values. The results are consistent in all three models (all countries, developed, and developing countries) and in line with the existing literature. According to the result, the relationship between the first lag of the deposit mix and the current deposit mix is significant and positive in all three forms of the datasets i.e. all countries, developing countries, and developed economies.

Table 6

Developing Countries-System GMM-Model (2)				
	Two-step	One-Step	Two-Step	One-Step
	(1)	(1)	(2)	(4)
Lag of Deposit Mix ^a	0.638*** (0.0992)	0.660*** (0.0905)	0.874*** (0.126)	0.812*** (0.107)
Interest cost ^a	0.0462 (0.0464)	0.0690 (0.0445)	0.0409 (0.0522)	0.0921** (0.0491)
Capital Cost ^a	-0.0837 (0.0615)	-0.102** (0.0532)	-0.117** (0.0672)	-0.159*** (0.0628)
Salary Expenditure ^a	0.00712 (0.120)	0.0796 (0.120)	0.0113 (0.106)	0.164 (0.140)
Stock Turnover Value ^a	0.0610*** (0.0161)	0.0667*** (0.0159)		
Market Capitalization Value ^a			0.0502 (0.0861)	0.163** (0.0860)
Price-earnings Ratio ^a	0.0692 (0.0554)	0.0677 (0.0489)	-0.0221 (0.105)	-0.117 (0.0917)
Gross Domestic Product ^a	-0.0416 (0.0356)	-0.0502** (0.0276)	-0.0383 (0.0694)	-0.146*** (0.0706)
Difference between 10-Year and 3-Month bill rate ^b	-0.0134 (0.00954)	-0.00613 (0.0101)	-0.00919 (0.00771)	-0.00598 (0.00834)
GFC ^b	-0.0431*** (0.0210)	-0.0471*** (0.0180)	-0.00288 (0.0169)	-0.00408 (0.0155)
Constant	0.526 (0.863)	0.425 (0.725)	-0.0773 (0.491)	0.108 (0.468)
Observations	286	286	286	286
No. of instruments	18	18	18	18
AR1 (p-value)	0.0164	0.00819	0.0147	0.00711
AR2 (p-value)	0.330	0.261	0.126	0.101
Hansen-J (p-value)	0.361	0.361	0.201	0.201

Standard errors in parentheses, ** $p < 0.10$, *** $p < 0.05$

As per the existing literature, interest cost on deposits plays an important role in attracting depositors. Table 5 shows that the interest costs and the time deposits have positive relationships. This positive relationship is consistent in all three datasets. The coefficient was highly significant (5 percent) and had a coefficient of around 12 percent in the two-step and one-step estimators in the all country dataset. However, this relationship varies as per the economic development of the countries. According to Table 7, interest costs⁶ of deposits is highly significant at five (5) percent level with a high coefficient at 12 percent in developed countries. On the other hand, Table 6 shows the low coefficient of about 4.6 percent but not statistically significant in most scenarios, except in the one-step estimator, using market capital

⁶ Interest cost= Interest expenditure on total deposits

value as one of the key determinants, in developing countries. This suggests that interest rate is one of the key determinants of deposit mix in developed economies but not in developing countries.

Table-7

Developed Countries- System GMM- Model (3)				
	Two-step	One-step	Two-Step	One-Step
	(1)	(2)	(3)	(4)
Lag of Deposit Mix ^a	0.803*** (0.103)	0.863*** (0.0882)	0.779*** (0.122)	0.859*** (0.0940)
Interest cost ^a	0.120*** (0.0286)	0.112*** (0.0284)	0.129*** (0.0401)	0.124*** (0.0314)
Capital Cost ^a	-0.595*** (0.204)	-0.584*** (0.220)	-0.406*** (0.161)	-0.424*** (0.141)
Salary Expenditure ^a	-0.216*** (0.0834)	-0.229*** (0.116)	-0.209 (0.133)	-0.272*** (0.125)
Stock Turnover Value ^a	-0.121** (0.0677)	-0.103 (0.0682)		
Market Capitalization Value ^a			-0.123*** (0.0552)	-0.122*** (0.0519)
Price-earnings ratio ^a	0.143*** (0.0541)	0.157*** (0.0554)	0.134*** (0.0527)	0.166*** (0.0535)
Gross Domestic Product ^a	0.307*** (0.145)	0.295*** (0.149)	0.213*** (0.0809)	0.245*** (0.0813)
Difference between 10-Year and 3-Month bill rate ^b	-0.00353 (0.0119)	-0.0117 (0.0113)	0.000404 (0.0121)	-0.00809 (0.0103)
GFC ^b	-0.0776*** (0.0339)	-0.0784*** (0.0391)	-0.0965*** (0.0399)	-0.117*** (0.0398)
Constant	-6.551*** (2.942)	-6.917*** (3.143)	-3.489*** (1.491)	-4.883*** (1.646)
Observations	230	230	230	230
No. of instruments	18	18	18	18
AR1 (p-value)	0.0127	0.00960	0.0135	0.0107
AR2 (p-value)	0.351	0.370	0.288	0.316
Hansen-J (p-value)	0.542	0.542	0.384	0.384

Standard errors in parentheses

** $p < 0.10$, *** $p < 0.05$

The focus of this research has been to study the effects of financial market development on the bank deposit mix. Therefore, the main variables are the stock-turnover value, the market capitalization value, and the PE ratio (LPE) of the countries. The stock-turnover value shows the interest of the investors in the stock market. According to Table 5, stock-turnover had positive and statistically significant coefficients 3.6 percent and 4.8 percent respectively in two-step and one-step estimators in all countries. The positive coefficient supports the argument of

the coexistence of the stock market and banking system. Song and Thakor (2010) have shown three forms of relationship between the financial market and the banking system i.e. coexistence, complementarity, and competition. In developing economies, we found complementary relationship between financial market and bank deposit mix. The coefficient was six (6) percent and statistically significant at 5 percent level in both two-step and one-step GMM estimators. However, in developed countries, the relationship is negative with 12 percent coefficient value in both two-step and one-step estimators but moderately significant at two-step estimator and one-step estimator result was not significant. The observed negative relationship suggests that in developed countries, stock market and banks compete with each other and investors freely shift their funds from one system to another.

We tested the same relationship between the bank deposit mix and the stock market development by using market capitalization as a variable. We did not find the statistically significant relationship in all the country and developing countries contexts using both two-step and one-step GMM estimators. However, we found the market capitalization is a meaningful indicator in developed countries context. The relationship between stock market capitalization and bank deposit mix was in line with the relationship between stock market turnover and bank deposit mix. Both estimators showed highly significant but negative coefficients (about 12 percent), which is in line with the results of using stock-turnover value as a key variable.

The difference in the direction of the relationship between the stock market and the time deposits reflects the difference in the investors' perceptions regarding the financial market in developed and developing countries. Investors in developed economies consider the financial market and the time deposits as investment products and use them to earn a higher yield. Therefore, the relationship between these two variables is negative, which suggests that investors shift their funds between these two instruments according to the earning

opportunities. This negative relationship between the stock market and the bank deposit mix of developed economies is consistent with results reported in the existing literature (Diamond, 1997). However, the same variables show a positive relationship in developing countries, which is against the expected theoretical relationship between the financial markets and the banking system. However, Song and Thakor (2010) studied the role of the banking system and the financial system in economic growth from borrowers' perspective and found that the banks and the financial markets complement each other in the countries which have low or non-existent securitization. Contrary to Song and Thakor (2010) we tested this relationship from lenders' (depositors') perspective and found a complementary relationship between these two financial systems in the developing countries, which do not have a market for securitization.

This result also suggests that the financial markets in developing countries are yet to integrate into the financial system. This is due to their lower financial inclusion which provides an opportunity for both systems to acquire new customers and grow together. It allows a few depositors to move money from bank deposits to the financial market, but the majority of the investors still select a time deposit for long-term investment. Thus, the stock market and time deposits both grow together.

Table 8 Account Ownership (Population percentage aged 15 and above)

Country	2017	2014	2011
Developed Countries			
Australia	100%	99%	99%
Canada	100%	99%	96%
New Zealand	99%	100%	99%
United States	93%	94%	88%
Developing Countries			
Indonesia	49%	36%	20%
India	80%	53%	35%
Malaysia	85%	81%	66%
Pakistan	21%	13%	10%

As reported in Table 8 above in three out of the four developed countries, 100 percent of the population, aged 15 and above years are bank account holders. The only exception in the US, in which 93 percent of the people of the age group 15 years and above are bank account holders. On the other hand, in the developing countries, the number of account holders vary, but they are lower. In India and Malaysia, around 80 percent of people have formal bank accounts whereas, in Indonesia, this percentage is 49 percent and in Pakistan, it is only 21 percent. This clearly reflects lower levels of financial inclusion in developing countries.

To verify the effects of financial inclusion in developed and developing countries, we used the number of commercial bank branches (CBB) as a proxy for the financial inclusion in the country. We found a strong positive relationship between the numbers of bank branches and the amount of time deposits in developing countries. As per appendix 5, the coefficient (about 10 percent) of the number of commercial banks was highly significant when use the stock turnover value as a proxy for financial market development in developing countries. However, when we used the market capitalization, we found mixed results. Nonetheless, since stock turnover is a better predictor of financial market development than the market capitalization in developing countries, we can conclude that financial inclusion helps banks in attracting time deposits in developing countries.

On the other hand, we could not find a significant relationship between financial inclusion and the bank deposit mix in the developed countries (see Appendix 6). This insignificant relationship is because of the less variation or growth in the financial inclusion level in the developed countries. Moreover, banks from countries such as New Zealand, Australia, and Canada are closing their branches due to the high-usage of online banking and cutting down the fixed cost. However, since we could not find significant results, we cannot infer the relationship between the financial inclusion and the bank deposit mix in the developed

countries' dataset. Despite this, we believe that the study related to financial inclusion can be explored in future with other variables.

Another variable, which is important to consider in the identification of the relationship between financial market development and the banking system is stock market yield. We considered the PE ratio of the stock market as a proxy for the market yield. We found a positive relationship between PE ratio and bank deposit mix in all three datasets viz. all, developed, and developing countries, except the developing country context where we replaced the variable stock turnover with the market capitalization. The positive relationship is consistent with the general understanding of investors' behavior in relation to savings. We found a strong relationship between the PE ratio and bank deposit mix in developed countries' context. Table 7 showed highly significant coefficient (around 14 percent) in all four regressions in developed countries contexts. We found the same significant relationship in all countries context. However, in developing countries this relationship was not prominent and showed mix results. When we replaced the variable stock-turnover value with the market capitalization value in developing countries, the relationship turned negative and statistically insignificant. Thus, we cannot infer any relationship between PE ratio and time deposits in developing countries. However, in the all countries and developed countries' contexts, it has a significant positive relationship. Thus, we can conclude that the investors do compare the market yield and interest rates for investment in developed countries.

We used salary as a control variable. Salary to total deposit ratio (SDP) represents the aggressiveness of banks in attracting deposits. The bank, which has a high amount of active depositors (demand depositors), needs a higher number of staff to serve them. Humphrey (1991) states that after the deregulation of interest rates, banks restricted the number of withdrawals from the money market mutual funds (MMMFs) and demand deposits to keep the banks' operational cost relatively low. Table 5 reports statistically significant negative

coefficients of 18 percent and 15 percent in the two-step estimators using stock-turnover and market-capitalization as variables in the all countries context, but one-step estimators showed statistically insignificant results.

Moving to the subsets of the dataset, we found a significant and negative relationship between salary expenditures and the bank deposit mix in developed economies. By contrast, developing countries showed statistically insignificant coefficients in all four regressions. Hence, we cannot conclude the relationship between the employees' cost and the bank deposit mix. On the other hand, in developed countries, employees play a major role in maintaining and managing bank deposits. The negative relationship between bank deposit mix and salary expenditures of banks in developed countries show the profit-making orientation of bank employees, this can be attained better by having more transaction accounts than non-transaction accounts. This result is consistent with the findings of Drechsler, Savov, and Schnabl (2018), who argued that since banks incurred high operating expenditures as a fixed cost, they should practice in maturity transformation by having more transaction accounts.

We used equity capital as a variable to identify the effect of bank financial stability on bank deposit mix, but could not find statistically significant results for this on the bank deposit mix in all the countries' dataset. Table 6 shows consistent negative coefficients in all four regressions in developing countries context. Three regressions out of the four showed statistically significant results. Similarly, the developed economies' banks showed a consistent negative relationship between the bank stability and the bank deposit mix. Table 7 shows high and statistically significant coefficients in all four scenarios. Hence, we can conclude that active depositors (transaction account holders) closely monitor the stability of banks through capital, and depositors like to do business with the stable firms in both developed and developing economies. However, this conclusion is more meaningful in the context of developed countries rather than developing countries. We believe that this is because of the two reasons viz. (a) the

education level of citizens and (b) the ownership of banks. A lower level of education limits depositors' ability to understand the significance of the capital in regard to the stability of banks for depositors. Secondly, the ownership of banks is broadly of two types, state-owned banks and private banks. State-owned banks are considered to be the most stable banks in developing countries. To the best of our knowledge, there is limited study on the effect of the relationship between the ownership of banks and the education level of a country on its bank deposit mix. This can be a useful area of further investigation.

We used the difference between the 10-Year bond rates and the 3-months bill rates as a proxy for the shape of the yield curve. We found consistent negative and low coefficients in all three datasets. In all countries context, only one regression out of four showed a statistically significant result. On the other hand, in developed and developing countries, none of the regressions showed a statistically significant result. Thus, we cannot make any inference out of this result in terms of the relationship between the shape of the yield curve and bank-deposit mix.

We have used two different sets of countries, developed and developing, in this study, our expectation being that macroeconomic factors also influence the bank deposit mix. There are several macroeconomic factors such as the gross domestic product (GDP), the per capita income, education, and inflation, among others, which may affect the bank deposit mix. We have however used the log of GDP as a proxy for the macroeconomic factors considering that other macroeconomic factors are closely related to the GDP of the country. We found a significant positive relationship between the GDP and the bank-deposit mix for developed countries. Table 7 shows the coefficient level of around 30 percent in both the two-step and the one-step estimators using stock-turnover as a key variable; while with the market capital value, the coefficient were 21 and 25 percent in the two-step and one-step estimators in developed countries representatives. By contrast, in developing countries, we found statistically

significant negative relationship two regression results using one-step GMM estimators, but two-step estimators did not show statistically significant relationship. Although, we found mix statistically significant results, we believe that the direction of relationship between the GDP and the bank deposit mix is negative.

We believe the two different results in developing and developed countries are consistent with the logic of the lifecycle hypothesis. According to Browning and Crossley (2001) as income increases, low-income people tend to spend more on certain goods such as education, housing, clothing, among others; while high-income earners tend to save more with increment in their income. Thus, in developed economies, people will start saving more, since they already meeting their necessary requirements.

We also controlled for the global financial crisis (GFC), as it was a major event in the period, we are considering. We used a dummy variable for the years 2007, 2008, and 2009. We found consistent negative and statistically significant coefficients in most of the regressions in all three datasets. In the all country, the coefficient was low (around 4 percent) but three out of the four showed statistically significant results. The developing countries also showed the same low but statistically significant coefficients in the two regressions viz. the two-step and the one-step estimators using stock-turnover value as a key variable. The other two regressions showed statistically insignificant coefficients in two-step and one-step estimators using market-capitalization as key variable. On the other hand, the developed countries (Table 7) showed high and statistically significant coefficients in all four regressions models. The regression models with stock-turnover value showed negative coefficients of about 8 percent, whereas, with market capitalization values, showed negative coefficients of around 10 and 12 percent in the two-step and the one-step estimators respectively. We conclude therefore that GFC negatively affects the time deposit base of the banks irrespective of the economic level of the countries. However, this relationship was more prominent in developed countries than

developing countries. This is in line with the existing literature, which suggest that the effect of the GFC was felt more in the developed economies.

5. Conclusion

This study is probably the first to investigate how the level of development affects the bank deposit mix in developed and developing countries. The results suggest that financial markets provide an alternative channel of investment to time deposits in all countries. However, when we studied the same relationship separately for developed and developing countries, we found that this relationship exists in developed countries, but not in developing countries. In developing countries, the financial market may be yet to integrate into the financial system, which may be due to “fear”, deriving from unfamiliarity, with the financial market for investment. It is against the general perception of academics, which is that the development of the financial market bring forth competition in the banking system. Thus, policymakers should consider the development of the financial market as a factor while devising guidelines or regulations related to the banking system.

Our results is align with the existing studies that the interest rate is one of the key determinants in attracting time depositors in both subgroups, viz. investors in both developed and developing countries. However, this relationship is more prominent in the developed countries than the developing countries. It is largely because of the greater accessibility to other financial products which makes investors in developed countries more sensitive to interest rates. Banks in developed countries should therefore use the interest rates wisely. Moreover, employee-costs also show a negative relationship in the developed-country context due to the expected focus of employees in improving the profitability of banks. On the other hand, we could not find a relationship between employee costs and time deposit in developing countries. This result also suggests that banks need to change the orientation of employees from seeking

greater profitability to the stability of the banks and to encourage them to attract more time deposits in developed countries. On the other hand, our results suggest that banks need to open new branches in rural and other areas less covered by banks to attract more time deposits.

The negative relationship between capital and deposit mix suggests that the 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 deposit in their funding to make themselves more stable. This is against the hypothesis of the new Basel-III regulation in which banks are encouraged to increase their capital to improve the stability of the banking system. The high amount of capital incentivizes banks to increase the proportion of checking accounts, which may eventually, decrease their stability. Thus, policymakers need to be cautious while using capital as a macro-prudential tool in stabilizing the banking system.

Likewise, there are other factors such as competition within the banking system, stability, ownership, income, and education which affect the deposit mix of banks. The study of these variables in their relationship with the bank deposit mix will give a more holistic view on the determinants of bank deposit mix. This is, in turn, will be useful for regulators in making policy decisions.

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Appendix 1

All Countries with the Year Effects				
	Two-Step	One-Step	Two-Step	One-Step
	(1)	(2)	(3)	(4)
Lag of Deposit Mix ^a	0.777*** (0.128)	0.888*** (0.126)	0.797*** (0.0966)	0.866*** (0.112)
Interest cost ^a	0.133*** (0.0520)	0.124*** (0.0520)	0.130*** (0.0355)	0.125*** (0.0386)
Capital Cost ^a	-0.0986** (0.0592)	-0.0327 (0.0601)	-0.0627 (0.0621)	-0.0438 (0.0518)
Salary Expenditure ^a	-0.0662 (0.0692)	-0.0253 (0.125)	-0.0624 (0.0784)	0.00173 (0.121)
Stock Turnover Value ^a			0.0514*** (0.0198)	0.0577*** (0.0216)
Market Capitalization value ^a	0.0902 (0.0601)	0.0860 (0.0779)		
Price-earnings ratio	0.103*** (0.0461)	0.0529 (0.0499)	0.128*** (0.0503)	0.0989** (0.0554)
Gross Domestic Product	-0.111 (0.0802)	-0.103 (0.105)	-0.0939*** (0.0453)	-0.108*** (0.0517)
Difference between 10-Year and 3-Month bill rate ^b	-0.0136 (0.0108)	-0.000859 (0.0150)	-0.00936 (0.0108)	- 0.000087 (0.0143)
Year=2005	0 (.)	0 (.)	0 (.)	0 (.)
Year=2006	0.00828 (0.0404)	0.0515 (0.0644)	0.0172 (0.0342)	0.0148 (0.0581)
Year=2007	-0.0633 (0.0435)	-0.0476 (0.0730)	-0.0486 (0.0329)	-0.0777 (0.0632)
Year=2008	0.0872*** (0.0395)	0.114*** (0.0391)	0.0492** (0.0295)	0.0494 (0.0473)
Year=2009	0 (.)	0.00289 (0.0463)	0 (.)	-0.0210 (0.0477)
Year=2010	0.0305 (0.0377)	0 (.)	0.0426 (0.0382)	0 (.)
Year=2011	0.0857*** (0.0375)	0.0714*** (0.0299)	0.0965*** (0.0353)	0.0720*** (0.0270)
Year=2012	0.0588** (0.0348)	0.0437 (0.0316)	0.0935*** (0.0393)	0.0582** (0.0324)
Year=2013	0.0570** (0.0310)	0.0317 (0.0336)	0.0999*** (0.0395)	0.0715** (0.0376)
Year=2014	0.0568** (0.0297)	0.0434 (0.0375)	0.100*** (0.0392)	0.0901*** (0.0419)
Year=2015	0.0243 (0.0255)	0.0477 (0.0639)	0.0554** (0.0307)	0.0514 (0.0644)
Year=2016	0.0454*** (0.0230)	0.0598 (0.0601)	0.0745*** (0.0280)	0.0678 (0.0604)
Constant	0.772 (0.885)	0.523 (1.059)	1.317 (0.853)	1.404 (0.970)
Observations	516	516	516	516
No. of instruments	27	27	27	27
AR1 (p-value)	0.000760	0.000758	0.000491	0.000448
AR2 (p-value)	0.0774	0.0646	0.0809	0.0632
Hansen-J (p-value)	0.316	0.316	0.293	0.293

Appendix 2

Developing Countries with the Year Effects

	Two-Step	One-Step	Two-Step	One-Step
	(1)	(2)	(3)	(4)
Lag of Deposit Mix ^a	0.537*** (0.139)	0.534*** (0.0974)	0.616*** (0.131)	0.620*** (0.101)
Interest cost ^a	0.0841 (0.0633)	0.0477 (0.0591)	0.0687*** (0.0350)	0.0369 (0.0436)
Capital Cost ^a	-0.130*** (0.0574)	-0.180*** (0.0626)	-0.107*** (0.0435)	-0.109** (0.0566)
Salary Expenditure ^a	-0.0641 (0.106)	0.0298 (0.0913)	-0.0583 (0.109)	-0.0255 (0.0807)
Stock Turnover Value ^a			0.0603*** (0.0264)	0.0682*** (0.0189)
Market Capitalization value ^a	0.171*** (0.0750)	0.230*** (0.0602)		
Price-earnings ratio	0.0471 (0.0776)	-0.0351 (0.0695)	0.178*** (0.0640)	0.140*** (0.0542)
Gross Domestic Product	-0.144*** (0.0709)	-0.176*** (0.0643)	-0.0813 (0.0503)	-0.0630 (0.0468)
Difference between 10-Year and 3-Month bill rate ^b	-0.0291*** (0.0139)	-0.0400*** (0.0145)	-0.0164 (0.0154)	-0.0183 (0.0149)
Year=2005	0 (.)	0 (.)	0 (.)	0 (.)
Year=2006	0.0166 (0.0430)	0.0114 (0.0359)	1.293** (0.692)	0.736 (0.780)
Year=2007	-0.108*** (0.0406)	-0.181*** (0.0525)	1.203** (0.688)	0.601 (0.800)
Year=2008	0.123*** (0.0523)	0.0961*** (0.0346)	1.346** (0.695)	0.771 (0.774)
Year=2009	0.00187 (0.0330)	-0.0355 (0.0340)	1.302** (0.702)	0.718 (0.804)
Year=2010	0.0247 (0.0385)	0 (.)	1.320** (0.713)	0.737 (0.791)
Year=2011	0.0450 (0.0385)	0.00441 (0.0355)	1.372** (0.727)	0.781 (0.812)
Year=2012	0.0156 (0.0347)	-0.0603 (0.0398)	1.357** (0.723)	0.752 (0.817)
Year=2013	0.0215 (0.0283)	-0.0627 (0.0480)	1.388** (0.727)	0.783 (0.823)
Year=2014	0 (.)	-0.0673 (0.0419)	1.386** (0.736)	0.805 (0.821)
Year=2015	-0.00903 (0.0208)	-0.0931 (0.0613)	1.342** (0.729)	0.708 (0.834)
Year=2016	-0.0144 (0.0161)	-0.0979** (0.0568)	1.324** (0.728)	0.691 (0.835)
Constant	0.613 (0.576)	0.108 (0.690)	0 (.)	0 (.)
Observations	286	286	286	286
No. of instruments	27	27	27	27
AR1 (p-value)	0.0210	0.0103	0.0179	0.00966
AR2 (p-value)	0.208	0.140	0.288	0.215
Hansen-J (p-value)	0.345	0.345	0.292	0.292

Standard errors in parentheses

** $p < 0.10$, *** $p < 0.05$

Appendix 3

Developed Countries with the Year Effects

	Two-Step	One-Step	Two-Step	One-Step
	(1)	(2)	(3)	(4)
Lag of Deposit Mix ^a	0.838*** (0.156)	0.952*** (0.0958)	0.870*** (0.116)	0.967*** (0.0944)
Interest cost ^a	0.103 (0.184)	0.0723 (0.0465)	0.113** (0.0606)	0.0621 (0.0439)
Capital Cost ^a	-0.532 (0.949)	-0.501** (0.283)	-0.518** (0.304)	-0.533*** (0.271)
Salary Expenditure ^a	-0.229 (0.263)	-0.276** (0.157)	-0.335 (0.259)	-0.298** (0.156)
Stock Turnover Value ^a			-0.107 (0.181)	-0.109 (0.0932)
Market Capitalization value ^a	-0.148 (0.719)	-0.174 (0.196)		
Price-earnings ratio	0.129 (0.182)	0.140** (0.0740)	0.131** (0.0775)	0.129*** (0.0638)
Gross Domestic Product	0.254 (0.980)	0.313 (0.274)	0.304 (0.425)	0.306 (0.206)
Difference between 10-Year and 3-Month bill rate ^b	0.0329 (0.101)	0.0235 (0.0208)	0.0199 (0.0480)	0.0209 (0.0194)
Year=2005	0 (.)	0 (.)	0 (.)	0 (.)
Year=2006	0.184 (0.130)	0.0939** (0.0508)	0.0830 (0.0584)	-7.117** (4.109)
Year=2007	0.110 (0.176)	0 (.)	0 (.)	-7.199** (4.120)
Year=2008	0.0176 (0.712)	-0.109 (0.153)	-0.0260 (0.0986)	-7.225** (4.163)
Year=2009	0.00281 (0.266)	-0.116*** (0.0557)	-0.0821 (0.0593)	-7.316** (4.122)
Year=2010	0 (.)	-0.116 (0.0969)	-0.0937 (0.134)	-7.344** (4.148)
Year=2011	0.0712 (0.187)	-0.0533 (0.0884)	0.00460 (0.112)	-7.244** (4.140)
Year=2012	0.115 (0.280)	-0.0311 (0.0873)	-0.00326 (0.0933)	-7.261** (4.174)
Year=2013	0.118 (0.196)	-0.0228 (0.0936)	-0.00914 (0.101)	-7.267** (4.156)
Year=2014	0.0273 (0.141)	-0.0546 (0.112)	-0.0531 (0.121)	-7.301** (4.131)
Year=2015	0.0764 (0.246)	-0.0149 (0.107)	-0.0169 (0.0915)	-7.247** (4.105)
Year=2016	0.143 (0.0881)	0.0473 (0.140)	0.0198 (0.128)	-7.196** (4.088)
Constant	-4.313 (10.46)	-5.461** (3.261)	-6.868 (7.865)	0 (.)
Observations	230	230	230	230
No. of instruments	27	27	27	27
AR1 (p-value)	0.0437	0.0107	0.0164	0.00598
AR2 (p-value)	0.406	0.330	0.395	0.333
Hansen-J (p-value)	0.985	0.985	0.997	0.997

Appendix 4

	OLS Results					
	All Countries		Developing Countries		Developed Countries	
	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6
Lag of Deposit Mix	0.669*** (0.000)	0.662*** (0.000)	0.609*** (0.000)	0.589*** (0.000)	0.645*** (0.000)	0.637*** (0.000)
Interest Cost	0.129*** (0.000)	0.108*** (0.000)	0.0111 (0.692)	-0.0313 (0.256)	0.173*** (0.000)	0.170*** (0.000)
Capital Cost	-0.0584 (0.189)	-0.0452 (0.318)	-0.0406 (0.300)	-0.0271 (0.502)	-0.144 (0.276)	-0.135 (0.296)
Salary Expenditure	-0.0509 (0.195)	-0.0146 (0.718)	0.0349 (0.409)	0.0514 (0.231)	-0.121 (0.104)	-0.0997 (0.186)
Stock Turnover Value	0.0424*** (0.000)		0.0275*** (0.001)		-0.0180 (0.666)	
Market Capitalization		-0.0633*** (0.016)		-0.0305 (0.308)		-0.0720 (0.181)
Price-earnings ratio	0.0515*** (0.041)	0.0755*** (0.006)	-0.0787*** (0.018)	-0.0566 (0.177)	0.113*** (0.005)	0.122*** (0.002)
Difference between 10-Year and 3-Month bill rate	-0.00801 (0.207)	-0.0115** (0.074)	-0.0113 (0.118)	-0.0165*** (0.022)	-0.00251 (0.817)	-0.00315 (0.771)
Gross Domestic Product	-0.0349 (0.299)	0.00633 (0.875)	-0.121*** (0.000)	-0.108*** (0.011)	0.111 (0.235)	0.142 (0.136)
GFC	-0.0226 (0.197)	-0.0138 (0.435)	-0.0406*** (0.024)	-0.0290 (0.109)	-0.0271 (0.412)	-0.0416 (0.218)
Constant	0.667 (0.517)	2.374*** (0.019)	4.161*** (0.000)	5.414*** (0.000)	-2.155 (0.444)	-1.468 (0.604)
<i>N</i>	516	516	286	286	230	230
<i>F</i>	173.3	165.2	26.07	23.77	125.4	126.6

Appendix 5

Developing Countries with the proxy of Financial Inclusion				
	Two-Step	One-Step	Two-Step	One-Step
	(1)	(2)	(3)	(4)
Lag of Deposit Mix ^a	0.733*** (0.0944)	0.739*** (0.0732)	0.851*** (0.138)	0.802*** (0.105)
Interest cost ^a	0.0810 (0.0598)	0.0840 (0.0516)	0.0681 (0.0574)	0.0887** (0.0528)
Capital Cost ^a	-0.0987 (0.0693)	-0.118*** (0.0485)	-0.0936 (0.0617)	-0.117*** (0.0493)
Salary Expenditure ^a	-0.00655 (0.118)	0.0792 (0.106)	-0.0260 (0.100)	0.0605 (0.116)
Stock Turnover Value ^a	0.0498*** (0.0186)	0.0540*** (0.0142)		
Price-earnings ratio ^a	0.149*** (0.0545)	0.171*** (0.0574)	0.0964** (0.0567)	0.0496 (0.0664)
Number of Commercial Bank Branching	0.104*** (0.0532)	0.0914*** (0.0432)	0.0453 (0.0556)	-0.000272 (0.0595)
Gross Domestic Product	-0.0858*** (0.0395)	-0.0855*** (0.0331)	-0.0476 (0.0856)	-0.115*** (0.0638)
Difference between 10-Year and 3-Month bill rate ^b	-0.0111 (0.00808)	-0.0114 (0.00823)	-0.0107 (0.00969)	-0.0176*** (0.00762)
GFC	-0.0412** (0.0236)	-0.0573*** (0.0193)	-0.00985 (0.0240)	-0.0335*** (0.0162)
Market Capitalization ^a Value			0.0356 (0.0941)	0.110 (0.0791)
Constant	1.093 (0.766)	0.846 (0.575)	0.250 (0.478)	0.410 (0.429)
Observations	279	279	279	279
No. of instruments	19	19	19	19
AR1 (p-value)	0.0231	0.0104	0.0282	0.00818
AR2 (p-value)	0.926	0.907	0.843	0.645
Hansen-J (p-value)	0.207	0.207	0.0939	0.0939

Standard errors in parentheses

** $p < 0.10$, *** $p < 0.05$

Appendix 6

Developed Countries with the proxy of Financial Inclusion				
	Two-Step	One-Step	Two-Step	One-Step
	(1)	(2)	(3)	(4)
Lag of Deposit Mix ^a	0.755*** (0.109)	0.849*** (0.0940)	0.779*** (0.122)	0.859*** (0.0940)
Interest cost ^a	0.139*** (0.0378)	0.130*** (0.0309)	0.129*** (0.0401)	0.124*** (0.0314)
Capital Cost ^a	-0.505*** (0.200)	-0.478*** (0.169)	-0.406*** (0.161)	-0.424*** (0.141)
Salary Expenditure ^a	-0.226** (0.118)	-0.282*** (0.123)	-0.209 (0.133)	-0.272*** (0.125)
Stock Turnover Value ^a	-0.0793 (0.0539)	-0.0593 (0.0424)		
Price-earnings ratio ^a	0.151*** (0.0624)	0.144*** (0.0557)	0.144*** (0.0628)	0.148*** (0.0550)
Number of Commercial Bank Branching	0.0401 (0.242)	0.167 (0.242)	0.0128 (0.266)	0.171 (0.257)
Gross Domestic Product	0.220*** (0.106)	0.213*** (0.0961)	0.177*** (0.0678)	0.175*** (0.0541)
Difference between 10-Year and 3-Month bill rate ^b	0.000263 (0.0129)	-0.00852 (0.00960)	0.00196 (0.0142)	-0.00694 (0.0103)
GFC	-0.0740 (0.0482)	-0.0894*** (0.0421)	-0.0863** (0.0522)	-0.107*** (0.0390)
Market Capitalization ^a Value			-0.0921** (0.0548)	-0.0645** (0.0382)
Constant	-5.027** (2.765)	-6.030*** (2.938)	-3.119 (2.453)	-4.680** (2.424)
Observations	226	226	226	226
No. of instruments	19	19	19	19
AR1 (p-value)	0.0226	0.0158	0.0247	0.0187
AR2 (p-value)	0.340	0.286	0.310	0.303
Hansen-J (p-value)	0.215	0.215	0.159	0.159

Standard errors in parentheses

** $p < 0.10$, *** $p < 0.05$

Appendix 7 Correlation Matrix of All Countries (dataset)

	LNTAT D	LIC	LCAP	LSDP	LGDP	LSTK	LMCAP	LPE	LCBB	DFY10Y3 M
LNTATD	1.000									
LIC	0.580	1.000								
LCAP	-0.506	-0.148	1.000							
LSDP	-0.466	-0.210	0.477	1.000						
LGDP	-0.423	-0.576	0.214	0.457	1.000					
LSTK	-0.333	-0.582	0.088	0.376	0.922	1.000				
LMCAP	-0.324	-0.604	0.110	0.362	0.962	0.955	1.000			
LPE	0.091	-0.242	-0.001	0.059	0.481	0.492	0.532	1.000		
LCBB	-0.242	-0.407	-0.033	0.223	0.543	0.483	0.553	0.271	1.000	
DFY10Y3 M	-0.407	-0.457	0.190	0.164	0.271	0.227	0.257	0.017	0.015	1.000