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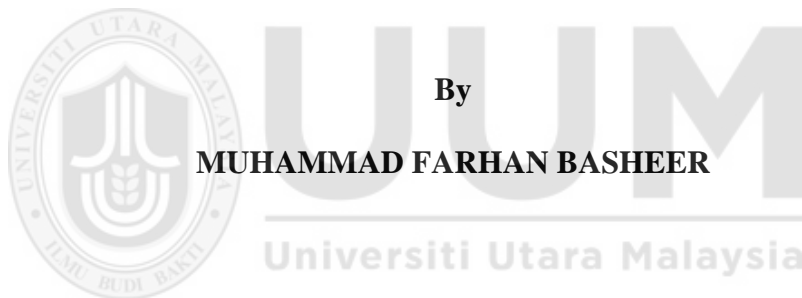


**THE IMPACT OF BANK REGULATORY CHANGES,
BANK SPECIFIC FACTORS, AND SYSTEMATIC RISK
UPON THE OFF-BALANCE-SHEET ACTIVITIES IN
SELECTED CONVENTIONAL COMMERCIAL BANKS
IN SOUTH ASIA**



**DOCTOR OF PHILOSOPHY
UNIVERSITI UTARA MALAYSIA
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SPECIFIC FACTORS, AND SYSTEMATIC RISK UPON THE OFF-
BALANCE-SHEET ACTIVITIES IN SELECTED CONVENTIONAL
COMMERCIAL BANKS IN SOUTH ASIA**



**Thesis Submitted to
School of Economics, Finance and Banking
University Utara Malaysia,
in Fulfillment of the Requirement for the Degree of Doctor of Philosophy**



Pusat Pengajian Ekonomi, Kewangan dan Perbankan
(School of Economics, Finance and Banking)

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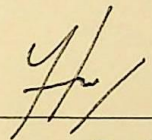
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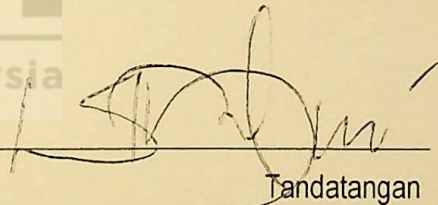
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ABSTRACT

Risk diversification is among the crucial issue's conventional banks face. The banking system in South Asia -, which is a diversified banking system, comprising of local and foreign banks , is also engaged in off-balance sheet activities. Therefore, the prime objective of the current study is to investigate the impact of bank-specific factors, bank regulatory changes and systematic risks on the off-balance sheet activities in conventional commercial banks of selected countries in South Asia namely Bangladesh, India, Pakistan and Sri Lanka . Based on the research objectives, the study employs two estimates, namely, fixed effects (FE) (time and country) and generalized method of momentum GMM (difference). Within the FE static methodology, the researchers estimated structure, comprising both country and time fixed effect in order to further account for financial shocks and other time-related events that affect each of the four countries. The majority of the findings show consistency with the market power theory, which indicates that the banks in South Asia consider the risks arising from the off-balance sheet activities and performance, as key determinants of off-balance sheet activities engagement. Banks in South Asia are also inclined to follow the market regulatory and tax theory, which claims that the increasing regulatory requirements in the form of capital requirement, provides banks with incentives to take excessive risks of off-balance sheet activities. The systematic risks arising from the macroeconomic factors also appear as a significant determinant of the off-balance sheet activities. The findings of the study have several practical implications that can be applied in the context of the bank-specific risks, regulatory pressure from regulatory restructuring and risks from the systemic factors. These implications are of great importance and will help the policymakers and practitioners to understand the issues related to the off-balance sheet activities.

Keywords: bank-specific risk, regulatory pressure, systematic risk, off-balance sheet activities, South Asia

ABSTRAK

Kepelbagaian risiko merupakan antara isu penting yang dihadapi oleh bank konvensional. Sistem perbankan Asia Selatan, yang merupakan sistem perbankan pelbagai, yang terdiri daripada bank tempatan dan asing juga terlibat dalam aktiviti luar kunci kira-kira. Oleh demikian, objektif utama kajian ini adalah untuk menyiasat kesan risiko khusus bank ke atas aktiviti luar kunci kira-kira dalam bank konvensional komersil Asia Selatan yang terpilih iaitu Bangladesh, India, Pakistan dan Sri Lanka. Berdasarkan objektif, kajian ini menggunakan dua anggaran, iaitu, kesan tetap (FE) (masa dan negara) dan kaedah momentum umum GMM (perbezaan). Dalam kaedah statik FE, penyelidik menganggarkan struktur, merangkumi negara dan kesan masa yang ditetapkan untuk menerangkan lebih lanjut mengenai kejutan kewangan dan kejadian lain berkaitan masa yang memberi kesan kepada keempat-empat negara. Kebanyakan hasil kajian menunjukkan konsistensi dengan teori kuasa pasaran, yang menunjukkan bahawa bank di Asia Selatan menganggap risiko yang timbul daripada aktiviti luar kunci kira-kira dan prestasi sebagai kunci penentu kepada keterlibatan aktiviti luar kunci kira-kira. Bank di Asia Selatan juga cenderung untuk mematuhi peraturan pasaran dan teori cukai, yang mendakwa peningkatan keperluan peraturan dalam bentuk keperluan modal, menyediakan bank dengan insentif untuk mengambil risiko berlebihan daripada aktiviti luar kunci kira-kira. Risiko sistematik yang wujud daripada faktor makroekonomi juga dilihat sebagai penentu aktiviti luar kunci kira-kira yang signifikan. Hasil kajian ini mempunyai beberapa implikasi praktikal yang dapat digunakan dalam konteks risiko khusus bank, tekanan peraturan daripada penstrukturan semula peraturan dan risiko daripada faktor-faktor sistematik. Implikasi-implikasi ini mempunyai kepentingan yang besar dan dapat membantu penggubal dasar dan pengamal untuk memahami isu berkaitan aktiviti luar kunci kira-kira.

Kata kunci: risiko khusus bank, tekanan peraturan, risiko sistematik, aktiviti luar kunci kira-kira, Asia Selatan

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CHAPTER ONE

INTRODUCTION

This chapter presents an overview of the issue of the off-balance sheet activities (OBSA) in commercial banks of South Asia. The first section highlights the background to the problem, and also sheds some light on the factors which affect the OBSA in the commercial banks of South Asia. The undertaker of OBSA has certain costs and benefits associated with it. In line with this issue, the research examines the factors which affect the OBSA of commercial banks in South Asia. The panel data analysis of the annual reports of commercial banks over five years from 2013 to 2017 is used to achieve the research objectives. This chapter is organised into the following sections. Section 1.1 discusses the background of the study. Section 1.2 highlights the systematic and unsystematic risks in the banking industry of South Asia. The regulatory and tax impositions on commercial banks of South Asia are highlighted in section 1.3. The persistency of OBSA is discussed in section 1.4. In section 1.5, certain issues and challenges, which constitute the problem statement of the study are discussed. This problem statement is followed by research questions and research objectives in sections 1.6 and 1.7, respectively. Next, the scope of the study is discussed in section 1.8. Finally, section 1.9 presents the significance and contribution of the study.

1.1. Background of The Study

From being financial intermediaries, commercial banks have undergone gradual evolution to become financial institutions that provide lending via the financial market (Ganguly, & Ojo, 2018; Mishkin, 2010). This is evident by the fact that commercial banks are now engaging more in risk transfers and risk trading (Allen & Santomero,

1998: Tagoe, 2016). Hence, steady transformations are taking place in the way commercial banks run their businesses which in turn have restructured the backdrop of the banking and financial systems. Generally, commercial banks run conventional and non-conventional banking activities. Conventionally, commercial banks carry out loan granting and deposit keeping. According to Brunnermeier et al. (2019), bank revenues mainly come from two income sources i.e. interest (conventional) which is derived from lending activities as well as securities holding and selling, and non-interest (off-balance sheet) which is derived from financial product fees including servicing and loan origination

The economic impact of the financial sector cannot be denied as the banking sector of any country plays an important role in the development of the economy. After almost a decade after the great financial crisis, the world economy is still in the stage of profound adjustment (An & Yu, 2018). The financial crisis has increased awareness on how such calamity could destabilise the financial system, in general, and the banking system, in particular. There is a need to have greater scrutiny on the repercussions of financial crisis on the banking industry. A group of World Bank researchers conducted a survey on the regulations and supervision of the banking system during the worldwide financial crisis (Anginer et al., 2018; Jones & Knaack, 2019) Their findings suggest a number of intriguing facts about the characteristics of countries that experience crisis, namely: loose limit on non-bank activities, lower capital ratio, less incentives for the private sector to monitor banks' risks and lax regulatory treatment of bad loans.

Moreover, the survey refers to the previous studies that have suggested that the weaknesses in regulations and supervision within the banking and financial system led to the financial crises. Extant literature has pointed out that incorrect incentive

mechanisms have driven bankers to chase higher returns on investment with less consideration given to risk exposure (Forelle, 2018). With that in mind, this activity could jeopardise the financial stability of commercial banks as well as depositors' money. This was motivated by incentives given in OBSA. Loan sales, for instance, offer the benefits of removing risky loans and improving banks' capital adequacy ratio and earnings. However, the benefits can potentially be cancelled out by the threat of less capital (equity) and potentially risky activities. It is obvious that in the post-crisis period, the banking industry is facing many challenges, and one of these challenges is the development of OBSA (An & Yu, 2018; Liu, Wu & Lou, 2018). The OBSA are receiving increasing attention, as the bank policies on traditional banking activities have a significant impact on the growth of OBSA (An & Yu, 2018; Liu, Wu, & Lou, 2018). Meanwhile, systematic risks have also a significant impact on the OBSA (An & Yu, 2018).

The OBSA are fee-based activities, which help banks in expanding their scope of operations and provide an additional source of fee-based income (Hou et al., 2015). The global financial system always moves with revolutionary trends in the global financial market (Omarini, 2016). One of the financial innovations of recent times is OBSA (Beck et al., 2016). However, the growth of OBSA in the commercial banks of South Asia is not on par with the global market. As the OBSA offer unique benefits, such as expansion of the scope and the mitigation and management of bank risks, therefore, during the course of the last two decades, especially at the start of the 21st century, the banking industry's engagement in the OBSA has increased significantly (Dymski, 2016).

To justify and explain the existence and increase of the OBSA in banks, researchers, policymakers and bankers have debated on several issues, such as the diversification of the risks, expansion in the scope of the operations and provisions against regulatory pressure (Eliss, 2019). However, in the case of the banking industry of South Asia, which is still in the developmental stage, the engagement in OBSA is lower than the other developing and developed countries. However, OBSA are used to mitigate risks; nonetheless, they are not free from risks (An & Yu, 2018). The banking market in South Asia is a saturated market where banks are striving to earn expected returns and the OBSA offer the opportunity for banks to earn expected returns, and at the same time, the risks associated with them is a continuous threat (Rakshit, & Bardhan, 2019)

Researchers (An & Yu, 2018; Firth, Li, & Wang, 2016; Meng, Cavoli, & Deng, 2017) have reported that around the world, the OBSA in the commercial banking sector have shown a rapid increase. The question that arises is why commercial banks use OBSA. Banks use OBSA for a different purpose. The prime reason for using OBSA is its capacity to generate additional cash inflows (An & Yu, 2018; Elian, 2012; Lozano & Pasiouras, 2010). Khambata (1989), and recently Toh, (2019) argued that the use of OBSA helps the banks to enhance their scope of operations, which increases bank income, which cannot be earned from on-balance sheet items or traditional banking activities. Another question central to it is why banks nowadays are more aggressive in terms of their scope of operations. The answer is increasing competition in the financial market, increasing credit risks and liquidity, and the risks are pushing the banks to explore new ways of earnings (Busch & Kick, 2015). So, one can argue from a banker's point of view that OBSA is a means to improve returns and bring value to the shareholders.

The other main purpose of performing OBSA is to manage banking risks (Cheng, Fung, Hu & Cheng, 2015). Because of their effectiveness in managing default, forward exchange and growth risk, banks nowadays are aggressively carrying out OBSA, and in some cases, they even overweigh the bank on balance sheet items (Lozano & Pasiouras, 2014). Shahida, Ismail, and Ahmad (2006), in their study, supported this argument and found that banks with high involvement in non-traditional activities are less risky. Notwithstanding, many researchers, such as Joon-Ho Hahm (2008), Stiroh (2002) and Calmes (2009), have argued that the increasing amount of the fee-based income may increase the volatility in the bank income, and hence, is source of greater risk. Therefore, OBSA are very risky, and their associated risks can transform into an opportunity or a threat. (Cheng, Fung, Hu, & Cheng, 2015; An & Yu, 2018). For example, guarantees which are a source of an additional income, also add the risk of future payments even in acute stress situations or unfavorable circumstances, whereas banks consider OBSA as a risk management tool and justify their overweighed figures as a trade-off between the risk of losses arising from interest-based or conventional banking activities (Ahmad & Misman, 2012; Aktan et al., 2013; Pushkala et al., 2017; Venkatesh et al., 2017).

Lastly, the banks justify engagement in the OBSA, as they offer shelter against the increasing regulatory requirements, such as minimum reserves and risk-free weighted average capital (Krishnamurthy, 2018; Ahmad & Hassan, 2010). As the OBSA are not part of the bank's balance sheet items, they are therefore, largely exempted from the regulations of the central bank. Addressing the aftermath of the crisis, governments around the world imposed certain regulatory restrictions on their financial sector to avoid any such event in future. These restrictions and increasing tax rates have shrunk

the net income of commercial banks. However, to avoid regulatory restrictions and income losses, banks are increasing the level of OBSA (An & Yu, 2018).

Because of the reasons mentioned above, OBSA has been increasing rapidly in recent years, but their extent is different across the world. It is evident that in recent years, along with the market-based reforms of interest rates and the mixed operations of the finance industry, commercial banks in South Asia tend to change the profit pattern and encourage financial innovation, especially develop the OBSA for the purpose of enhancing their competitiveness and diversifying their sources of revenue.

According to Ahmad (2007), the ratio of the aggregated OBSA to aggregated total assets in Eastern Europe, South and Central America, Africa and the Far East and Central Asia, is equivalent to 15%, 12%, 18% and 12% in 2005, respectively, compared to 60%, 63% and 41% for North America, North American Free Trade Agreement (NAFTA) and G7 countries, respectively. Similarly, studies carried out by Aktan et al. (2012) in Turkey, and Ahmad and Misman (2012) in Malaysia, have reported that the OBSA are showing an increasing trend. As part of the global financial system, there has been a shift in the sources of income of the commercial banks in South Asia. The relative share of income from traditional banking activities has decreased, and that of non-interest income has increased. For example, according to Hailu (2010), Firth, Li, and Wang (2013), Du, Worthington, and Zelnyuk (2016), Meng, Cavoli, and Deng (2017), the non-interest earnings have emerged as a major source of earnings of commercial banks around the world. In the next section, a brief statistical analysis of OBSA in the commercial banks of South Asia is presented.

1.2.OBSA in Selected banks in South Asia

The banking system in South Asia, which is a diversified banking system and comprising local and foreign banks, is also engaged in OBSA (Wolff & Papanikolaou, 2014; Perera et al., 2014). The OBSA in selected banks in South Asia have decreased significantly from 43% in 2013 to 26% in 2017 (see Figure 1.1).

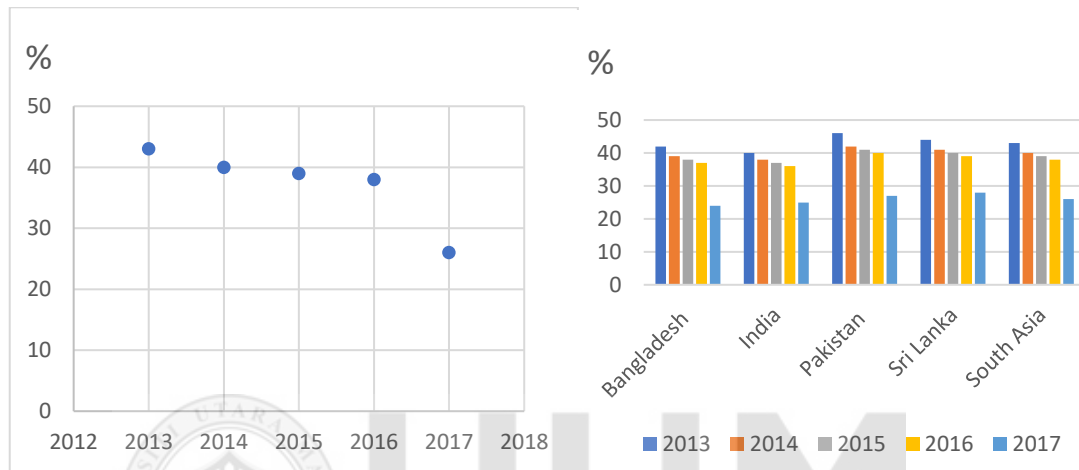


Figure 1.1
OBSA (% of total assets) in the Commercial banks of selected banks in South Asia
Source: Annual reports of the Banks

Figure 1.1 shows the growth of off-balance-sheet activities and total asset of Figure 1.1 shows the growth of OBSA and total assets of selected commercial banks in South Asia since 2013. The 2013 was the year when the OBSA in selected commercial banks of South Asia started to decline. Figure 1.1 clearly illustrates that the growth of OBSA is less than the growth of total assets of the commercial banks in Pakistan and India during the period of 2013-2017. Thus, the limited usage of the OBSA in the selected banks of South Asia indicates that the banking sector in these countries namely Bangladesh, Pakistan, India, and Sri Lanka still relies on the traditional banking businesses as the main source and use of funds.

As discussed above, banks around the world are increasing their engagement with OBSA to manage the risks arising from the traditional banking activities, macroeconomic indicators, and also regulatory changes (Brunnermeier et al., 2019). Hence, in the following section, the bank-specific risks, macroeconomic risk position and the regulatory pressure on the banks of big four countries of South Asia, is discussed.

1.3. The Risk Position of Commercial Banks in South Asia

In the current section, we have discussed the bank risk arising from bank-specific and macroeconomic factors.

1.3.1. The Bank Specific Risk Faced by Commercial Banks in South Asia

The current risk status of a particular banking sector determines its risk-taking behaviour (Lim, Woods, Humphrey, & Seow, 2017). Systematic risk is one of the components of all bank risks, which can be managed and mitigated by appropriate strategic initiatives (Elian, 2012; An & Yu, 2018; Akande, Kwenda, & Ehalaiye, 2018). Bank-specific risks are one of the key determinants of off-balance-sheet engagement of any bank (Elian, 2012). However, notable scholars have not reached a consensus on the relationship between bank-specific risks and OBSA. A group of researchers, following the market portfolio theory, have argued that engagement in OBSA could be seen as a risk diversification strategy, and banks engage in OBSA to avoid excessive risks (Basheer et al., 2019; Elian 2012). However, another group of researchers who advocate the market power theory, have considered OBSA as a source of additional risk and restrict riskier banks from engaging in OBSA (Choi, Fedenia, Skiba, & Sokolyk, 2017; Ayadi, Arbak, Naceu, & Groen, 2015). Thus, the systematic risk of any commercial bank has a significant impact on the OBSA.

The OBSA diversification strategy entails not only the effect on profitability, but also on the risk exposure of the bank (Sinkey, 2002). As such, discourses on OBSA should include the subject of diversification gains as a key topic. This is addressed in the theory of modern portfolio which deliberates how the combination of assets with diverse risks and return profiles as well as lower correlation coefficients can lead to lower portfolio risks. Commercial banks may require diversification when there is negative correlation between their OBSA income and conventional services income (Rose & Hudgins, 2013).

According to Rose and Hudgins (2013), the negative correlation between two distinct financial products will lead to higher returns and lower variance risks. With the prevalence of diverse OBSA revenues, common knowledge regarding these activities is hence arguable. This current study thus intends to investigate the correlation between non-conventional activities and risks. The increasing share of OBSA has exerted substantial impacts on profitability as well as risks of commercial banks. The increased competition in the financial market has sizably reduced commercial banks' market share. In view of this, stakeholders expect diversification to OBSA by the banking industry to improve banks' earnings and to restore their position in the financial market. In spite of their losses in traditional activities, banks have maintained their position in the financial market (Boyd & Getler, 1995). Similar to the other types of financial decisions, diversification to OBSA also has some inherent risks which may pose a threat to the stability of the financial system. Owing to these risks and returns relationship, it is imperative to assess non-traditional activities from these two angles. Therefore, the discussion above sheds light on the systematic risks of banks in South Asia.

1.3.1.1. Credit risk and OBSA in Selected commercial banks in South Asia

According to the Basle Committee on Banking Supervision (2000: 1), credit risk can be defined as the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms. One of the key components of bank-specific risks is credit risk (Waemustafa, & Sukri, 2015). Credit risk, in terms of non-performing loan, is one of the main reasons that compels banks to change their income structure (Waemustafa & Sukri, 2015). According to Scannella, and Polizzi (2019), credit risk is an essential factor that determines the bank's engagement in OBSA. However, there is still no agreement on the nature of the relationship between credit risk and OBSA. Researchers following the market power theory, have argued that an increase in credit risk will reduce the bank's engagement in riskier OBSA whereas researchers following the market portfolio theory, which considers the OBSA as a risk mitigation tool, have argued that increasing credit risk will accelerate the bank's engagement in OBSA.

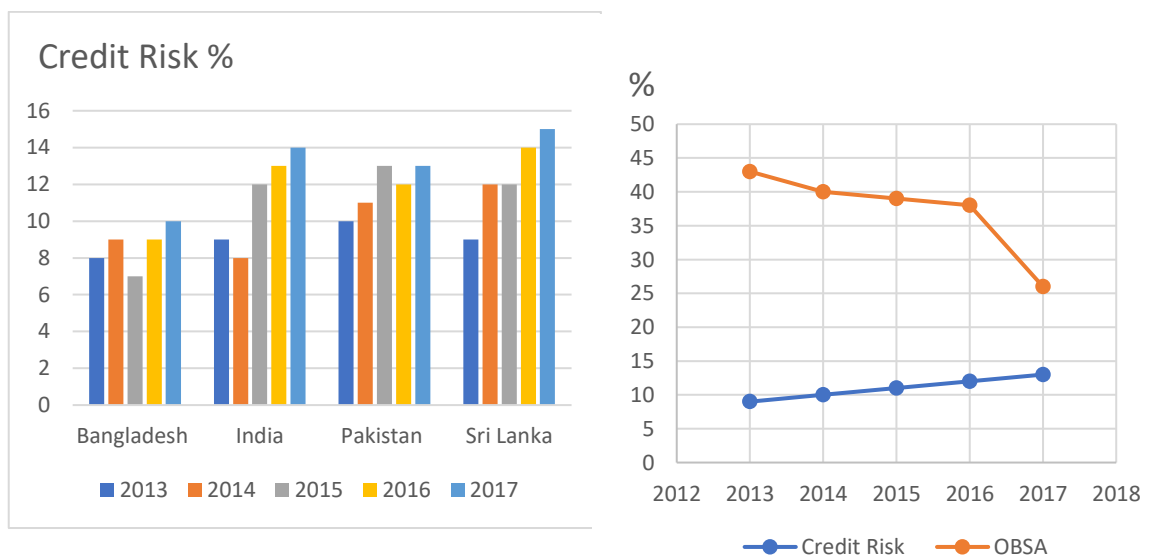


Figure 1.2.
Credit Risk vs. OBSA in Commercial banks of selected countries in South Asia
Source: Annual reports of the Banks

The credit risk in selected countries in south Asia is increasing (Edirisuriya, Gunasekarage, & Perera, 2019; Islam, & Nishiyama, 2019). It is evident from the figures that on aggregate, in four countries of South Asia, the credit risk has increased from 8% to 14% (see Figure 1.2). Thus, from the latest trend of the data, it can be argued that the bank-specific risks, in terms of credit risk, are higher in commercial banks of South Asia and continuously increasing from 2012 onwards. The changing dynamics of the banking industry, in the shape of OBSA, are significantly affected by the credit risk in South Asia (Al-Harbi, 2019). Actually, the engagement in OBSA is also seen as a structural shift in bank lending. Many of the OBSA, in essence, offer unique credit risk management (Waemustafa, & Sukri, 2015). Hence the study examines credit risk as one of the factors that affects the OBSA in commercial banks of South Asia.

1.3.1.2. Profitability and OBSA in the selected commercial banks of South Asia

The profitability of a bank is among the key determinants of bank risks (Al-Harbi, 2019), and significantly contributes to overall banking risks and also to income diversification strategies, such as the engagement in OBSA (Kints & Spoor, 2019). Many empirical studies, following the market power theory, have found that the engagement of profitable banks in OBSA is higher than the non-profitable banks (Bendima, Benbouziane, Bendob, & Bentouir, 2019). According to the market power theory, the OBSA are very risky and banks only engage in these activities when the conventional risks are low. Another group of researchers, following the market portfolio theory, have argued that banks struggling to earn the expected profits, engage in OBSA to avoid the risks (Bendima, Benbouziane, Bendob, & Bentouir, 2019; Elian,

2012; An & Yu, 2018; Akande, Kwenda, & Ehalaiye, 2018). The market portfolio theory views the OBSA as a risk diversification tool (Basheer et al., 2019).

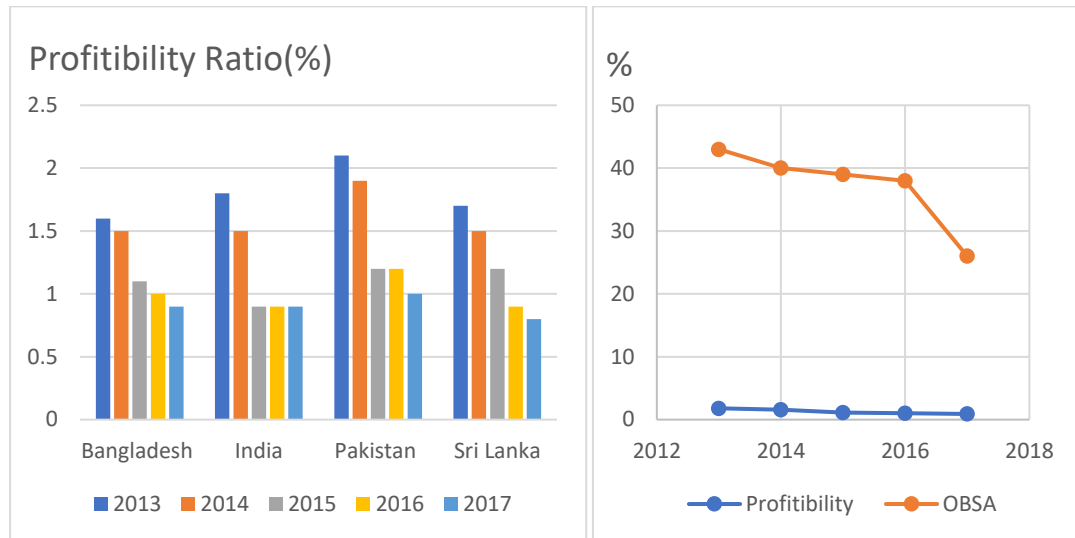


Figure 1.3. Profitability Ratio of Banks Vs OBSA in selected Commercial banks of South Asia
Source: Annual reports of the Banks

It is evident from Figure 1.3, that the profitability banking sector in four countries of South Asia have fallen over the course of five years from 2013 to 2017. The declining trend in the profitability of banks in selected countries of South Asia, indicates that increasing credit risk and liquidity risk and decreasing market power, significantly affect the performance of banks in South Asia (Ammar, & Boughrara, 2019; Edirisuriya et al., 2019; Nisar et al., 2018; Islam, & Nishiyama, 2016). This also has led to another argument that in South Asia, because of decreasing profit margin, banks are avoiding the riskier OBSA. Thus, considering the importance of the issue of decreasing profitability, the current study examines profitability as a determinant of OBSA.

1.3.1.3.Fee-based income and OBSA

Interest income is the main source of earning for conventional banks. However, liberalisation of prudential regulations has made banks diversify their income sources from interest income to non-interest income to mitigate the financial risks. In past studies (Toh, Gan & Li, 2019; Berger, Hasan, & Zhou, 2010; Apergis, 2014; Maudos, 2017), it has been highlighted that diversification in non-interest income significantly and negatively affects insolvency risk. Nonetheless, the banks are more involved in non-interest income activities, resulting in a higher level of insolvency risk as compared to the banks which are involved only in interest income activities (Bian, Wang, & Sun, 2015; Chen, Huang, & Zhang, 2016; Maudos, 2017). This finding is further supported by Williams and Prather (2010) and Chen, Huang, and Zhang (2016), who found that banks' higher involvement in fee-based income is riskier than interest-based income because it is more volatile and less predictive. In contrast to diversification, several scholars (Osuagwu, Isola & Nwaogwugwu, 2018; DeYoung & Torna, 2013; Apergis, 2014), have shown that limited involvement in the diversification of income reduces risks and increases profit. To check how successfully countries are incorporating this financial innovation, the data of fee-based income as a percentage of total interest income of banks in the selected countries of South Asia is examined (see Figure 1.4.). It is evident from the figure that the fee-based income of the commercial banks in the selected countries of South Asia is on decline from 9.09% to 5.12% (see Figure 1.4.).

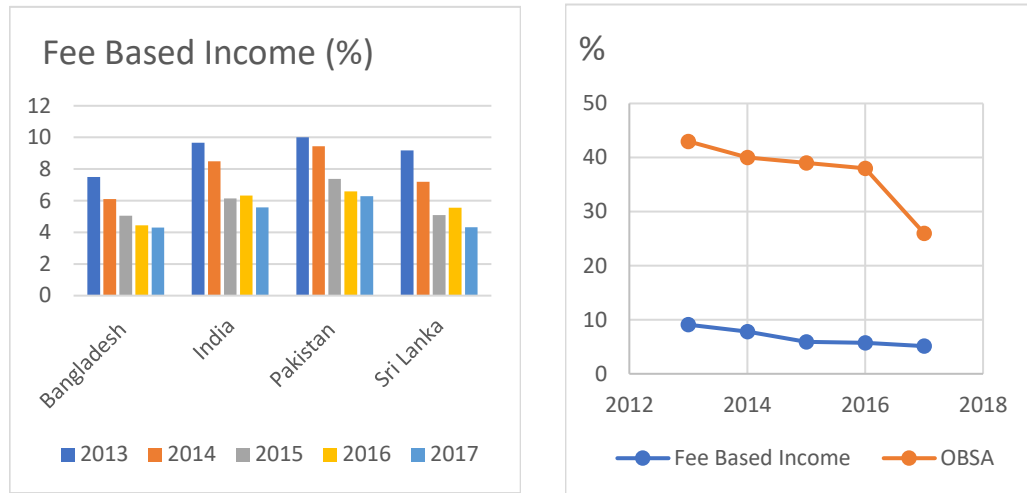


Figure 1.4.
 Fee-based Income Vs. OBSA of Commercial banks of selected countries in South Asia

Source: Annual reports of the Banks

According to Ye (2015), commercial banks in different parts of the world, are following the portfolio theory, and diversifying their scope to OBSA. He continued and argued that the OBSA is a means of risk diversification, whereas Franke and Karahnen (2007) who followed the market power theory, argued that the OBSA is a source of risk and banks in a stable position should engage in OBSA. According to the portfolio theory, the diversification strategy of banks plays an important role in the level of OBSA of the banks in the selected countries of South Asia (Ammar, & Boughrara, 2019). Thus the relationship between the fee based income and OBSA in the selected countries of South Asia needs to examine.

1.3.1.4. Liquidity Risk and OBSA

Liquidity (or funding) risk can be defined as the potential that banks (or firms) will be unable to meet their obligations as they fall because they lack the ability to liquidate some of their assets or raise enough funding from new sources at reasonable costs (Chatterjee, 2018; Toh, Gan, & Li, 2019). Liquidity risk, like credit risk, is one of the key determinants of banking sector performance (Dahir et al., 2018; Berger & Sedunov,

2017: Li, Wei, Lee, Zhu & Wu, 2018). Thus, it can be argued that liquidity risk is an important determinant of OBSA (Swain & Panda, 2017). The liquidity ratio of banks in the selected countries of South Asia decreased from 10.9% in 2013 to 6.95% in 2017. Ammar, & Boughrara , (2019) following the market portfolio theory, argued that the appalling financial conditions is because of increasing liquidity risk, and consequently, overall risks of the banks can lead to decreasing the value of banks; subsequently, the banks may engage in OBSA.

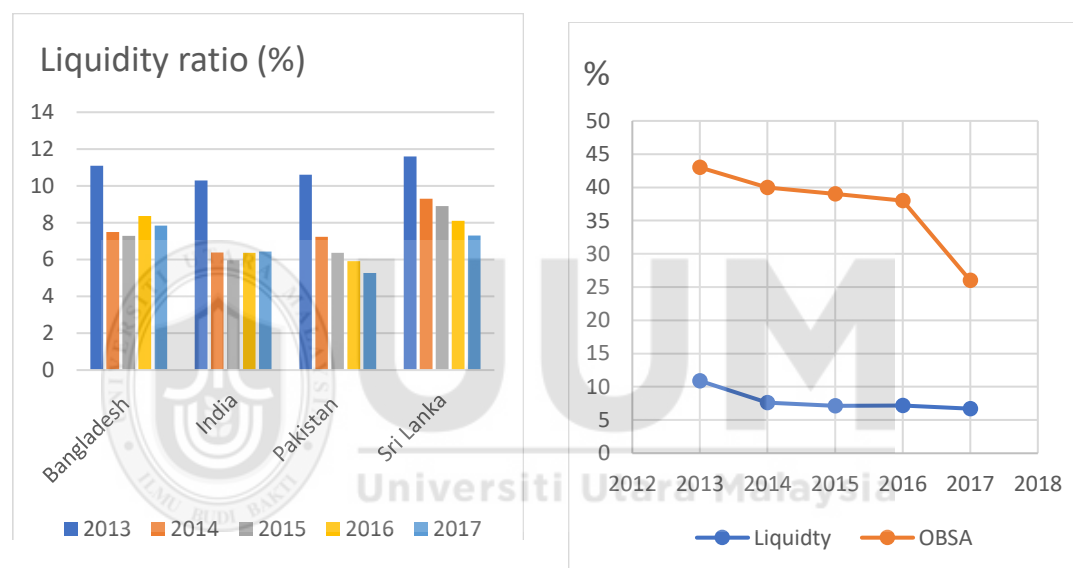


Figure 1.5.
Liquidity ratio of Banks in Commercial banks of selected countries in South Asia
Source: Companies Annual reports

Thus, it can be argued that despite increasing reliance on risk-free government debt that helps in lowering the level of non-performing loans, the banking sector of these selected countries in South Asia with increasing NPL ratio is facing an efficacy issue as the profitability of the bank is decreasing and the decreasing level of OBSA can affect the liquidity of banks by slowing down the liquidity creation process. Meanwhile, it has been found by Sabahat (2017) that the liquidity creation process slows down when banks disengage from OBSA; this indicates that decreasing level of OBSA can affect the liquidity creation process and can increase liquidity risk.

1.3.1.5. Market power and OBSA

Market power is another key determinant of bank-specific risks (Tabak et al., 2015; Toh, Gan & Li, 2019). Market concentration implies high market power, where a few banks hold a sizeable portion of the market. Market concentration, which brings about more market power, has certain costs and benefits, such as, it makes it easy for the regulators to regulate the market and help the market in accessing the pure market risks (Rakshit, & Bardhan, 2019; Nisar et al., 2018). However, it may cause systemic risk, and failure of one big bank can lead to the collapse of the market (Leroy & Lucotte, 2017).

Theoretically, market power and diversification to the OBSA, have an ambiguous relationship. The market power theory argues that OBSA are riskier and the banks with higher market power should engage in these activities (Elian, 2012). On the other hand, the market portfolio theory, considers OBSA as a source of risk and argues a negative relationship exists between market power and OBSA (Phan & Daly, 2016). In other words, when the concentration of the market is reduced, and the size and distribution of banks become more dispersed, banking sector competition is expected to rise which leads banks to offer different financial products, such as OBSA (McKee & Kagan, 2018).

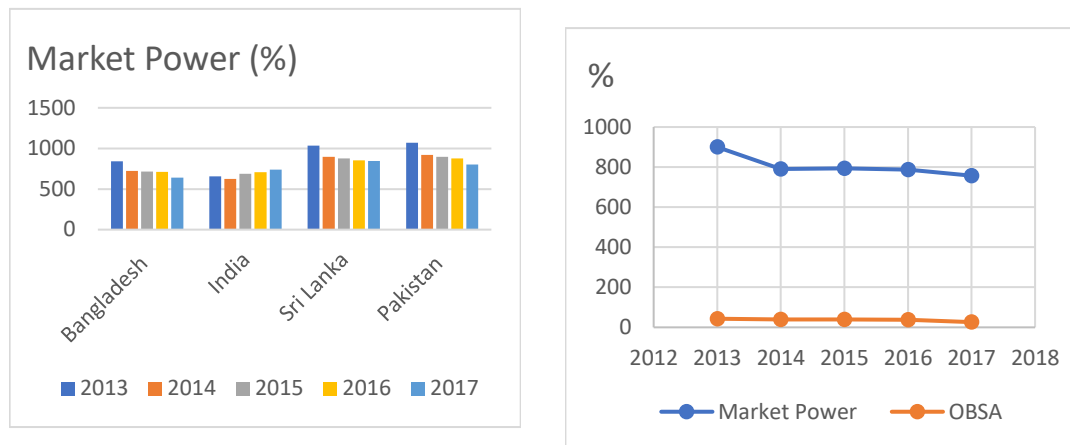


Figure 1.6
 HHI value of Banks in selected countries in South Asia
 Source: Companies Annual reports

It is argued that a Herfindahl-Hirschman Index (HHI) value below 1,500 is an indication of a competitive market. In the current study, the HHI value of all four countries is less than 1,000 (Buthelezi et al., 2019). From 2013, the market power of the banks in selected countries of South Asia fell gradually but significantly. The decreasing market power of banks in the South Asia has increased competition, and ultimately, bank-specific risks. The fact is evident from the recent mergers of 10 Indian public banks, where in order to enhance competitiveness in the market, the government merged the 10 smaller banks into larger banks. Similarly, during the sample period (2013-2017), the smaller international banks, namely, the Standard Chartered Bank and the Citibank, merged into a big bank and many underperforming banks are on partial merger. The increasing competition in the saturated banking market of the selected countries in South Asia (Nguyen et al., 2012; Rakshit, & Bardhan, 2019), is making it difficult for the smaller banks to compete effectively by just relying on traditional banking.

1.3.1.6. Capital and OBSA

Capital acts as a cushion against losses that might result from taking on excessive risks by a bank's management (Toh, Gan, & Li, 2019). To protect the depositors' money and to ensure the stability of the banking sector, banks are advised to hold a buffer of capital (Khan et al., 2017; Le, 2019). Generally, it is argued that banks with a greater volume of risky assets should retain a higher buffer of capital. In support of this argument, Chang & Talley (2017) posited that an undercapitalised bank will face the high cost of accessing capital, and an overcapitalised bank will face the opportunity cost of holding an excessive amount of capital. In the case of South Asia, the capital ratio has declined significantly, and the decline was gradual in Bangladesh, where it fell from 14.15% in 2013 to 8.13% in 2017 (as shown in Figure 1.7).

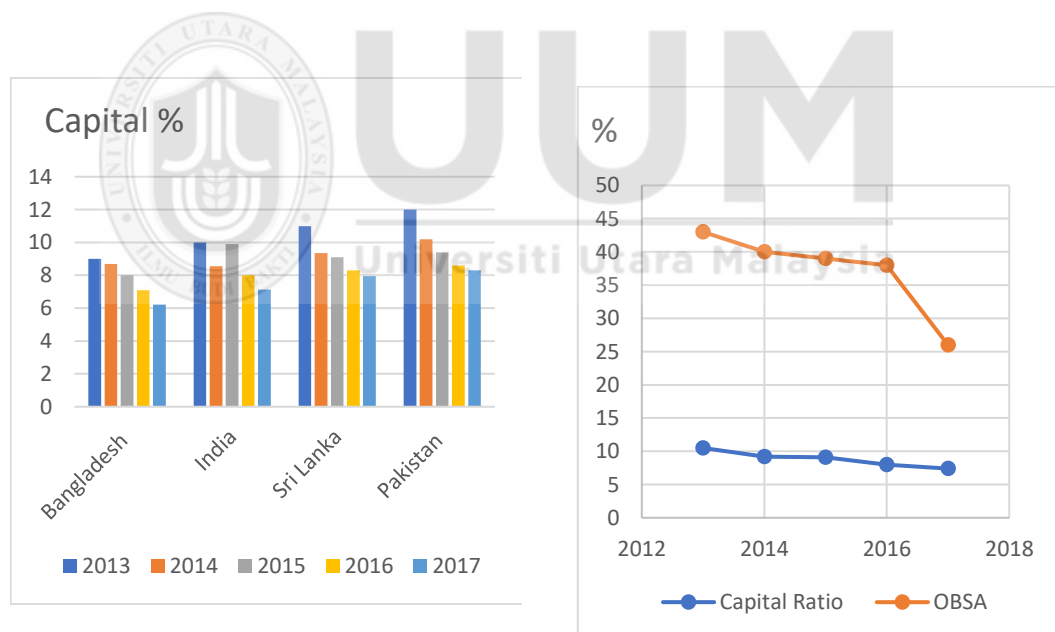


Figure 1.7
Bank Capital Ratio of Commercial banks of selected countries in South Asia
Source: Annual reports of the Banks

From the data, it is evident that the risks in three commercial banks in South Asia are high and increasing. The increasing bank-specific risks from the traditional banking activities and decreasing OBSA are clear indications of the issues facing the banking industry of South Asia, which is still relying on the traditional activities which are at a

mounting risk. The increasing risks in the banks of South Asia is one of the reasons for the decreasing engagement in OBSA. Thus, the current study looks into the OBSA, which are a source of fee-based income carried out by the commercial banks in South Asia to hedge the risks from bank-specific factors.

1.3.2. The Systematic risk Faced by Banks in South Asia

Along with bank-specific risks, systematic risk, arising from macroeconomic factors, is a significant contributor to bank risk. A group of researchers (Elian, 2012; Raz et al., 2015; Oladokun et al., 2019; Nisar et al., 2018), have argued that systematic risk has a significant impact on OBSA. Though the banks are still earning a profit, there are some elements which adversely affect their income.

1.3.2.1. Spread ratio and OBSA

It is consistent with real-time economics and the banking scenario in South Asia. During the last decade, banking costs have been adversely affected due to a reduction in the spread between borrowings and lending interest rate in Pakistan from 4.3 percent in 2013 to 2.30 percent in 2017 (see Figure 1.8), increase in labour and administrative costs and increase in non-interest expense (Khalil et al., 2015). Bangladesh increased the interest spread from 1.8 in 2013 to 3.9 in 2017, and the interest rate spread of India is almost the same. The interest rate spread change in Bangladesh explains why despite increasing non-performing assets, the Bangladeshi commercial banks have managed to earn profits. The change in spread ratio has significantly affected bank decisions to engage in OBSA.

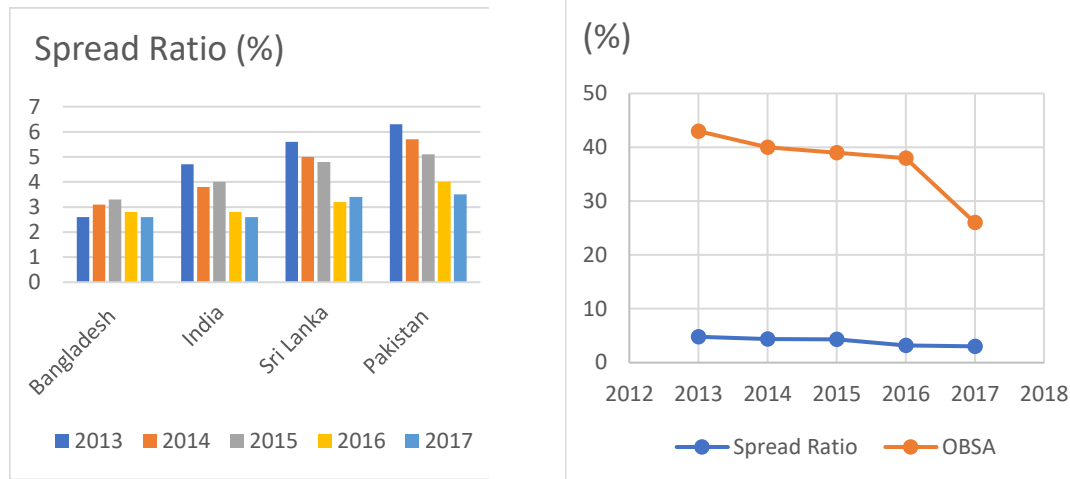


Figure 1.8
 Spread Ratio of Banks in Commercial banks of selected countries in South Asia
 Source: World Bank (Global Financial Release).

Furthermore, the reduction in overall lending and growth activity within the economy has caused a decline in banking output in terms of loans and advances (Ahmad, 2007).

It is observed that the large banks in South Asia are enjoying the expansion and increased number of branches (Badunenko & Kumbhakar, 2017). However, the expansion of operational scope in terms of diversification to non-interest income activities by these big banks has decreased significantly (Sharma & Anand, 2018).

1.3.2.2. Trade balance and OBSA

Since the occurrence of the subprime crisis, the relationship between macroeconomic risks and bank performance is a highly debated topic (Ibrahim & Rizvi, 2018). Vulnerabilities, such as a decrease in export, volatility in the exchange rate and increasing foreign exchange rate, are affecting the performance of the banking sector of south Asia (Ibrahim & Rizvi, 2018).

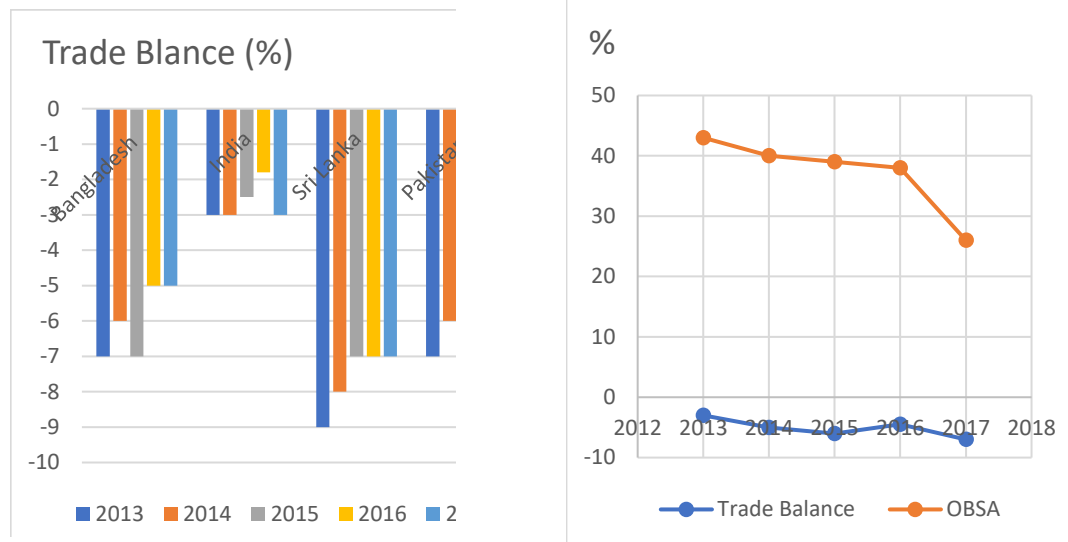


Figure 1.9
Trade Balance of selected countries of South Asia
Source: World Bank

The decreasing exports in South Asia have significantly impacted on corporate lending and savings, banks' fee-based earnings and foreign exchange rate (Edirisuriya et al., 2019; Nisar et al., 2018). For example, in Pakistan, for import purposes, private credit demand is increasing, which subsequently, is forcing banks to increase deposit ratio by offering a higher rate. Consequently, banks' foreign assets are falling, which can increase their reliance on the international market for liquidity, and banks are increasingly relying more on traditional banking activities. Meanwhile, the interest rate spread of the banking sector South Asia continuously declined from 4.8% in 2013 to 2.92% in 2017, which could have been due to continuous pressure on banks' expected returns. It is also the case in India, whereas Bangladesh has shown a significant improvement in its trade deficit by an improvement of 2%. Meanwhile, the increasing OBSA ratio of Bangladeshi commercial banks provides support to the notion that the trade-related activities have a significant impact on the volume of OBSA. Thus, it is argued that the slow trade-related economic activities, especially decreasing trade and

increasing volume of high yielding medium to long-term domestic debt, are the reasons for banks' lack of interest in OBSA.

1.3.2.3. Exchange rate and OBSA

The foreign exchange rate of selected countries in South Asia is also increasing and is recording a historical high of 106 Pakistan Rupees in 2017 (SBP) (as shown in Figure 1.10). The exchange rate is a critical determinant of OBSA (Benazić & Radin, 2015). Meanwhile, during the last ten years, the foreign exchange rate of our selected countries in South Asia has been highly volatile. The volatility in the foreign exchange rate is the biggest constraint in the way of smooth trade-related banking operations and indirectly affects the level of OBSA in commercial banks of South Asia (Chuhadary, Hashmi, & Khan, 2016).

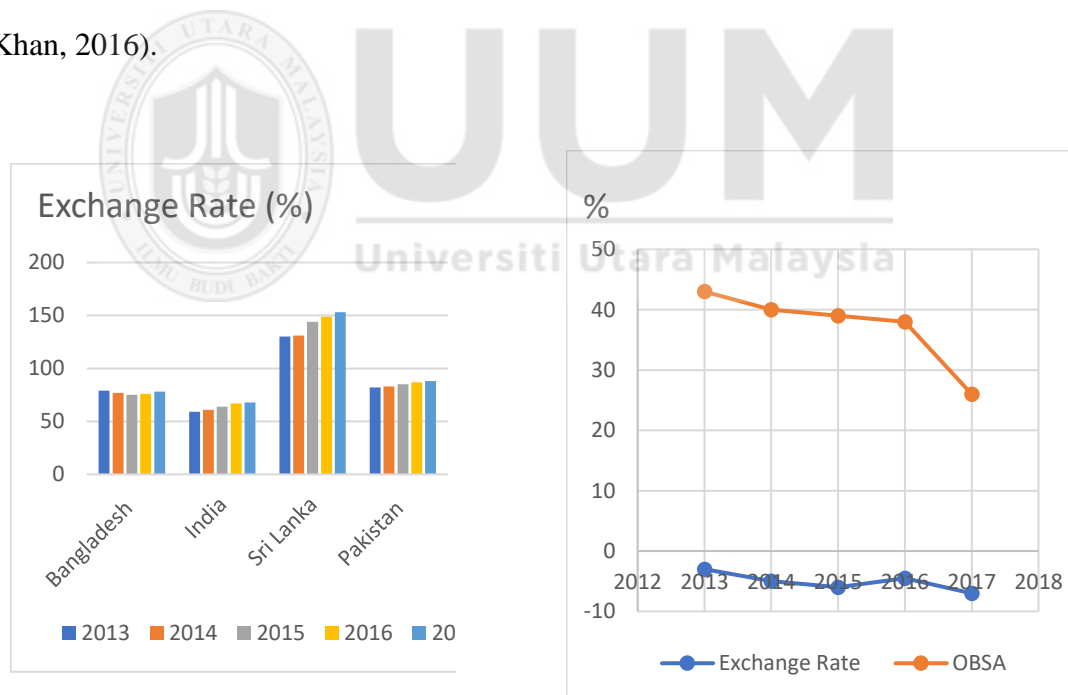


Figure 1.10
Exchange Rate of selected countries in South Asia
Source: International Monetary Fund (IMF)

The facts mentioned above reveal that the banks in South Asia are bearing systematic risks and it has been argued that these risks have a significant impact on the banks' risk management strategies.

1.3.3. The Regulatory Pressure on The Banks of South Asia

The Asian financial crisis, and the recent episode of the great recession during subprime crisis, has made the world realise the importance of the role of macro-prudential regulations, such as capital requirements and the reserve requirements on the health of the financial sector. Many prior researchers (Lewis, 2013; Berger et al., 2016) have argued that regulatory pressure has mounted in terms of increasing reserves and capital requirements and have had a significant impact on the off-balance decisions of banks. Following the regulatory and tax theory and the market discipline theory of banks, the current study uses two regulatory measures namely the capital adequacy ratio and reserve ratio to access the regulatory pressure.

1.3.3.1. Reserve Ratio and OBSA

Complying To comply with Basel III¹, every incorporated bank of any country is required to hold a certain portion of the profit in a statutory reserve and the process

¹ The Basel Committee on Bank Supervision (BCBS) had established the banking regulations known as the Basel Accords i.e. **Basel I, II and III** that specifically address capital, market and operational risks to guarantee that banks possess adequate capital to buffer against unanticipated losses.

Basel III introduces a series of reforms for improving the regulation, supervision and risk management of the banking sector. By the end of 2009, the BCBS issued the initial version of Basel III enabling banks to fulfill all the set requirements within a time period of three years. Banks are obligated to retain adequate leverage ratios and fulfill the set minimum capital conditions mainly due to the credit crisis.

Basel III continuously improves the bank regulation framework. An augmentation of Basel I and II, it aims to enhance the banking sector's capability in dealing with financial pressures, improving its risk management and fortifying its transparency.

should continue until the amount equals to the paid-up capital of that bank. The reserve ratio of banks in South Asia have decreased significantly and gradually from 6.6% of total deposits in 2013 to 2.45% in 2017 (see Figure 1.11). The decreasing reserve ratio highlights the notion that banks in South Asia, because of decreasing profitability, are unable to comply with the requirements. The decreasing reserve requirement, which is indirectly linked to profit after tax, is an important determinant of OBSA (Hassan, 2006).

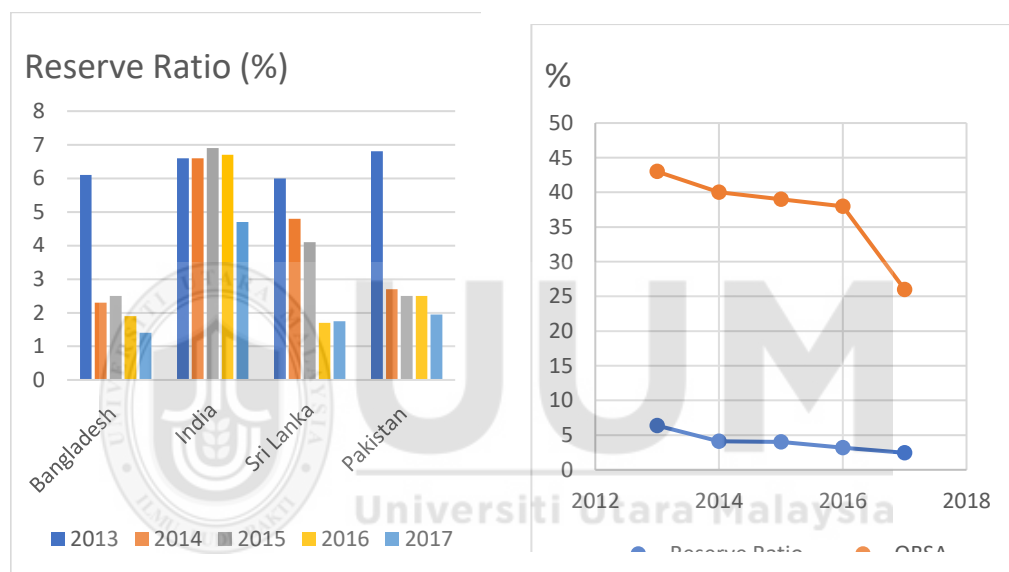


Figure 1.11
Reserve Ratio of Banks in selected countries of South Asia
Source: Annual reports of the Banks

The decreasing reserve ratio among the banks is revealing the fact that the banks in the selected countries of South Asia cannot maintain the targeted level of reserves. The failure of the traditional banking activity is compounding the pressure, and banks are still unable to engage in OBSA.

Basel III aims to create resilient banks that can withstand risks associated with widespread system shocks

1.3.3.2. Capital adequacy ratio and OBSA

A stream of regulatory and tax impositions has helped the banks in South Asia to install an efficient regulatory environment (Edirisuriya et al., 2019). Regulators around the globe, to maintain the safety and soundness of banks and the stability of the financial system, are paying close attention to the capital adequacy ratio of banks (Kints & Spoor, 2019). However, to maximise the return on equity, banks prefer to operate with minimal capital. The reason why banks avoid having higher capital is because they prefer higher returns associated with higher risks, whereas regulators force the banks to increase the capital to remain safe and sound.

To reduce bank risks, including insolvency risk, credit risk, liquidity risk and market risk, the Basle Committee has proposed different agreements (known as Basle Accords) that specify minimum capital requirements to be applied by banks (Ayadurai & Eskandari, 2018). Under Basel III rules, capital requirements for trading book exposures, complex securitisations and exposure to off-balance-sheet vehicles have to be enhanced substantially, for better risk coverage.

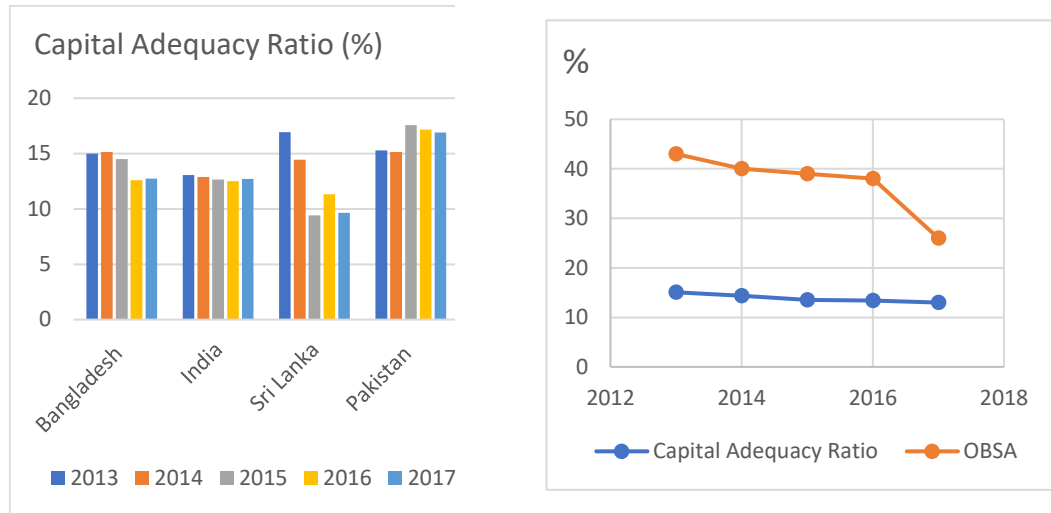


Figure 1.12
Bank Capital Adequacy Ratio of banks in the selected countries in South Asia
Source: Annual reports of the Banks

Despite the increase in the minimum level, such as in Pakistan, from 17.5 to 19.5%, India, 16%, Bangladesh, 12.5% and Sri Lanka, 14%, the falling capital adequacy ratio of the banks in selected countries in South Asia countries indicates that these banks are unable to meet the capital adequacy requirements. However, in these banks, despite higher capital adequacy ratio requirements and falling banking reserves, the banks are diverging their focus from non-traditional banking. This divergence can be explained, which basically promotes the collective approach of all market players in the promotion of transparency in risk disclosure. The market discipline theory advocates that the institutes work under market discipline.

1.4. Persistency of OBSA

The increased competition in financial markets of selected countries South Asia have sizeable dropped commercial banks market share. In view of this, following market portfolio theory, diversification to OBSA has been expected by stakeholders of banking industry to improve banks earnings and to restore their position in financial market. Nevertheless, their loss in traditional activities, banks have maintained their position in

financial market (Boyd & Getler, 1995). Similar to the other type of financial decisions, according to market power theory, diversification to non-traditional activities also possess some inherent risks which may pose as threat to the stability of the financial system. Owing to this risk and return relationship it is imperative to assess non-traditional activities from various angles.

The trend of OBSA in banking industry has spread widely across the globe. Based on table figure 1.1., the share of non-traditional activities over total asset has increased in selected countries in south Asia. The variability OBSA of commercial banks is determined by a number of factors which depends on different factors such as bank risk, bank regulatory changes and macroeconomic factors. The increasing bank specific risk, macroeconomic risk, and mounting regulatory pressure paced a significant impact on the OBSA engagement. However, according to notable researchers to determine the factors of financial decision it is necessary to examine it is therefore necessary to examine the persistence of that phenomena. As in our case the it is argued that the OBSA engagement can be seen as a function of bank specific risk, bank regulatory changes and macroeconomic factors and bank either diversifying the market portfolio, increasing the market power, diverting the regulatory pressure or managing systematic risk, it is therefore necessary to examine the persistence of OBSA over time.

1.5. Statement of The Problem

The world is dynamic and evolving rapidly, whereas the slow-moving powerful organizations, which once determined the behavior of entities, have now found competition in the more dynamic entities. The financial industry is one among them. The digitalization of banking has opened a window of operations for the banks; however, it is also a continuous threat to the traditional banking activities. This issue is

more intense in the developing countries, where almost 95% of the financial sector comprises banks (Demirguc-Kunt, 2019). The reasons for the rapid growth of OBSA over recent years, have been much debated and is not discussed in this thesis; it only highlights the issues, such as increasing bank-specific risks, mounting regulatory pressure and unsystematic risks, that contribute to the problems linked to OBSA engagement in the banks of South Asia.

The privatization of state-owned financial institutions and the liberalization of restrictive financial sector policies has transformed the banking industry of South Asia (Nisar et al., 2018). The market structure of South Asian countries is highly concentrated. The financial sector of selected South Asian countries namely Bangladesh, Pakistan, Indian, Pakistan is supervised and regulated by the multiple agencies; however, the central banks usually play major role in any banking reforms. Over the course of last twenty years, all the four banking markets are also undergone a series of regulatory reforms. Resultantly, the share of off-balance sheet activities has decreased significantly for the banks of this region (Basheer et al. 2019). Doumpos et al. (2016) broached an argument that there is a significant difference between revenue diversification strategies of banks in the developed and developing countries. This fact warrants an intense investigation into the topic for South Asian banks which has been largely ignored in existing literature. The only exceptions are Nguyen et al. (2012), who focus on the interaction of market power, revenue diversification and bank stability for some selected South Asian countries, Pennathur et al. (2012), who put some light on the effect of ownership on income diversification and risk for Indian banks, and Nisar et al.(2018) who studied the impact of revenue diversification on bank profitability and stability. These three studies provide some important insights on South Asian banks,

but they do not directly provide evidence on the effect of bank specific risk, bank specific regulatory changes and macroeconomic risk on the OBSA.

Over the last two decades, the increasing regulatory pressure, economic conditions, and some bank-specific factors, have been playing a key role in determining bank income (An & Yu, 2018; Liu, Wu, & Lou, 2018). Most banks in South Asian, because of increasing pressure from these factors, have not been able to earn expected returns and their performance is deteriorating (Rahman et al., 2018). The reactions of commercial banks towards a number of threats are considered normal under the corridor of corporate strategy. They need to survive in a competitive environment of financial markets. However, unlike other industry, the situation in banking industry is different in which the depositor's money are put at stake in this new venture so called non-traditional activities. The terrible experience of the 2008 global financial crisis can be taken as hard lesson on how investing depositors' money in risky activities could harm the financial stability of commercial banks and financial system. Non-traditional activities that produce non-traditional and other fee-based income, are deemed giving positive impact to commercial banks' financial performance. This view stems from the perception that non-traditional income and traditional income are uncorrelated (Chiorazzo et al., 2008; Rose & Hudgins, 2013). Moreover, modern portfolio theory suggests negative correlation amongst financial assets will improve portfolio performance. In view of this, if traditional and non- traditional activities have low or even negative correlation, commercial banks can reap diversification gains of combining the two.

In this case, OBSA provides an opportunity for bankers to earn additional revenue (Elian, 2012). As the banks, this adoption is very extensive and noticeable in different

regions of the world (McCauley et al., 2019). In South Asia, over the last 60 years, and particularly, from the last four decades, banks are undergoing very unpredictable economic situations. The significant decrease in OBSA activities during the last five years has raised certain doubts on the why and what for this decrease (Edirisuriya et al., 2019). In such a situation, it is difficult to predict the undertaking of OBSA by commercial banks in South Asia, as the factors which affect the OBSA differ from country to country and region to region (Elian, 2012).

The major problem which banks in South Asia are facing is the increasing bank-specific risks. From Table 1.1. it is evident that all the indicators of bank-specific risks signal higher bank-specific risks in the selected countries in South Asian. Increasing credit risk, liquidity risk and market concentration as well as decreasing profitability, fee-based income, and equity capital, indicate that the bank-specific risks in selected countries of South Asia is high.

Table 1.1.
Bank specific risk in selected conventional Banks South Asia

	OBSA	Credit Risk	Profitability	Liquidity	Fee-Income	Market Power (HHI)	Capital
2013	43	9	1.8	10.9	9.09	900	10.5
2014	40	10	1.2	7.6	7.81	791	9.2
2015	39	11	1.4	7.13	6.17	794	8.6
2016	38	12	1	7.19	5.73	788	8
2017	26	13	0.9	6.95	5.12	757	7.4

Source: Annual reports of the Banks in Pakistan, Sri Lanka, Bangladesh, and India

In South Asia, credit risk, which is one of the significant determinants of bank-specific risks, is high and increasing and the banks have not been successful in improving their asset performance (Edirisuriya et al., 2019). Credit risk has a significant impact on the banks' engagement in OBSA (Laidroo & Mannasoo, 2017). A higher value of NPL

ratio places a burden on the banks' balance sheet. Actually, the lending practices of South Asian countries largely rely on collateral rather than credit assessment and cash flow analysis (Perera et al., 2014). Therefore, the change to the OBSA also represents a structural shift in borrowing as if the banks are facing credit risk, which has been considered to be the most important risk for commercial banks. Further, poor asset quality has been the cause of more banking failures (Ahamed et al., 2017). OBSA, such as guarantees and acceptance, are regarded as a direct substitute for credit risk (Wen et al., 2017). Meanwhile, the selling of loans remains a credit risk on the asset sold to the third party and has emerged as one of the significant factors as it also offers credit risk and banks come under pressure for increasing capital ratio and/or changing their level of engagement in OBSA. Similarly, some OBSA, such as writing an option, offers unique credit risk distribution characteristics, as having a proper control system on conventional trading of options benefits the banks in managing conventional risks. Thus, the trade-off between credit risk from conventional banking activities and OBSA is one of the reasons why banks engage in OSBA. The issue with the banks in South Asia is that higher credit risk from the conventional banking activities in a highly saturated market and decreasing profitability is pushing the banks to engage in OBSA. However, the structural shift in borrowing through engagement in OBSA, i.e., moving from the direct lending channel, is difficult for the banks in South Asian as these markets are more vulnerable to crisis and indirect lending places constraints on the short-term fund arrangements (Nawaz, 2019). The literature on the relationship between credit risk and OBSA is limited, and in the context of banks in South Asia, is scarce. Thus, it is worthwhile to examine the impact of total loans and risks arising from the loan loss (credit risk) on the OBSA of banks operating in the selected banks of saturated banking markets of South Asia.

The second most important indicator of bank-specific risk is liquidity risk. Liquidity risk is a risk that banks will not be able to generate enough funds to meet their obligations. Table 1.1. indicates that the liquidity risk in the banks of selected countries of South Asia is high and increasing. The increasing liquidity risk, and subsequently, the funding difficulties, force the banks in selected countries of South Asia to purchase relatively expensive deposits, which may constrain the willingness of the highly competitive market to supply the funds at competitive rates, considering the banks have serious liquidity problems. According to Basheer et al. (2019) and Alfarisi (2015), OBSA is used for liquidity creation. Baltas, Kapetanios, Tsionas, and Izzeldin (2017) argued that OBSA has been successful in liquidity creation among the banks of South Asia, whereas Chatterjee (2018) and Hovath et al. (2016) argued that OBSA has no role in liquidity creation. Practically, many types of OBSA, such as commitments, are callable in nature and can be called by the borrower in any case of market reaction. This can make OBSA riskier, and hence, increasing the vulnerability of credit risk and consequently, liquidity risk (Waemustafa, & Sukri, 2016), and decreasing the profit of banks operating in the saturated banking market of South Asia (Perera et al., 2014). In addition, provisions against the loan losses are declining the capital base of these countries (Edirisuriya et al., 2019). The issues are further aggravated by increasing market concentration in selected countries of South Asia (Islam & Nishiyama, 2016). Hence, the current study addresses the risks arising from the weak liquidity position, increasing competition and poor asset performance, as key determinants of OBSA.

Over the last two decades, increasing bank-specific risks, is making it difficult for the banks to earn additional income (Li et al., 2017). In this case, where bank-specific risks are increasing, OBSA provides an opportunity for bankers to make additional fee-based earnings (Sun et al., 2017). The fee-based income is one of the reasons why banks

engage in OBSA (An & Yu, 2018). Bank-specific risks have a significant impact on the level of OBSA (An & Yu, 2018; Elian, 2012). However, OBSA is not free from risks, as empirical evidence from the previous literature has shown that non-interest income is riskier than interest margin income because it only offers diversification in earnings-based portfolio but not in risks of the banks (Williams & Prather, 2010; DeYoung & Torna, 2013). Non-interest income also produces higher insolvency risk and higher returns volatility than disbursement of loans (Stiroh, 2004a; Stiroh & Rumble, 2006; Lepetit et al., 2008a). In South Asia, interestingly, the fee-based income in a country with decreasing OBSA ratio, i.e., Pakistan, is increasing, which indicates that OBSA are riskier and their increasing volume may pose risks to the bank. Studies on the U.S. banking system have concluded that it creates a positive effect on both profitability and insolvency (Li & Zhang, 2013; Apergis, 2014).

Ahmad (2012), Elian (2012) and Meng, Cavili, & Deng (2017) found bank size as an important determinant of OBSA of commercial banks. They argued that larger banks, because of economies of scale and more exposure to risks, are more efficient and have the ability to engage in OBSA. It has also been argued that larger banks are equipped with more competent and qualified personnel, which help in winning consumers' trust in their ability to manage their risks. Considering their superiority and growth, clients feel confident of their banks engaging with OBSA. However, the impact of bank size on OBSA is ambiguous. On the one hand, it is argued that large banks utilise specialised management skills that allow them to engage in OBSA; whereas on the other hand, growing banks usually enjoy the economies of scale and stable growth in revenue, which encourage risk diversification and offer fewer incentives for engagement in OBSA. Because the larger a financial institution, the greater may be its potential to diversify its asset portfolio (Hassan, 2006), in South Asia, the increasing market

competition is reducing the market share of big banks. Thus, it is crucial to examine the impact of bank size on OBSA, as in the saturated banking market of South Asia, the determination of OBSA is an important and emerging issue.

The regulatory and restructuring measures, namely the capital adequacy and reserve requirements undertaken during and after the subprime crisis, have focused primarily on discouraging banks from taking excessive credit risk, and ensuring banks reduce their exposure levels by diversifying revenue sources and promoting the overall health of banks and their systems (Komijani & Taghizadeh-Hesary, 2018). In the follow-up to the post-financial crisis, regulatory restructuring in the sample countries in South Asia are following BASEL III (from 2013 onwards), which in turn, is constantly increasing regulatory and tax pressure on the banking industry of South Asia (Rehman et al., 2018). It is evident from Table 1.2 that the reserve ratio in selected banks of South Asia has fallen and capital adequacy ratio has decreased over the course of the last five years.

Table 1.2.
Regulatory pressure in selected South Asian conventional Banks

	RR	CAR
2013	6.6	15.07
2014	4.1	14.4
2015	4	13.53
2016	3.2	13.4
2017	2.45	13

Source Source: Annual reports of the Banks in Pakistan, Sri Lanka, Bangladesh, and India

The higher capital adequacy ratio (CAR) requirements, in selected south countries in Asia such as 19.5% in Pakistan, 14.0% in Sri Lanka, 16.0% in India and 12.5% in Bangladesh, indicate that banks in South Asia are under high regulatory pressure (Edirisuriya et al., 2018). Meanwhile, in Pakistan, the aggregate risk-weighted capital adequacy ratio (CAR) of the banking system has risen to 19.5% compared to the minimum required ratio of 10.50% as per the recommendations of the State Bank of

Pakistan (Abbas et al., 2018.).The reserves of Pakistani and Bangladeshi banks, which are accumulative of 10% annual profit after tax, are also going down, which indicates that regulatory pressure is affecting the banks' income contribution to reserves (Abbas et al., 2018). In such a regulatory environment, banks around the world are opening operating windows to fee based OBSA (Elian, 2012). However, banks in South Asia banks are just relying on investment in risk-free government securities. Of late, to improve the market discipline, the Indian government merged 10 public banks, which were unable to follow the reserve and capital market requirements, into large banks. Similarly, in Pakistan, the smaller banks which were unable to meet the requirements merged into larger profitable banks. Therefore, the impact of regulatory factors on OBSA is of great importance as this distortion in the allocation of bank's assets away from productive sectors to financing deficits, is nothing to be celebrated about, and as a matter of fact, should be discouraged. Thus, the impact of the increasing regulatory pressure from post-financial crisis regulatory restructuring on OBSA needs to be investigated.

The decrease in exports, and volatility in the exchange rate are weakening the financial system of selected countries in South Asia (see Table 1.3). Despite the improving Gross Domestic Product (GDP) and inflation ratios, the decreasing level of exports is a continuous threat to GDP growth and trade-related economic activity (see Table 1.3).

Table 1.3.
Systematic risk in selected South Asian conventional Banks

	Spread Ratio	Trade Balance	Volatility in Exchange rate
2013	4.8	-3	80
2014	4.4	-5	82
2015	3.8	-6	85
2016	3.2	-4.5	87
2017	2.9	-7	88

Source: World Bank

The slowdown in economic activity has forced the banks of South Asia to change their risk-taking behaviour and invest in risk-free, low-rated government securities (Perera et al., 2014.). Meanwhile, the declining exports are affecting OBSA, as most of the OBSA come from exports (Perera et al., 2014). Similarly, the increasing regulatory pressure and levies are narrowing the interest spread (Sorokina et al., 2017). To avoid the risks arising from narrowing spread, the banks around the world are increasing their engagement in OBSA (Zhang, Xie, Lu, & Zhang, 2016). The OBSA are primarily based on the foreign exchange rate. The volatility in exchange is a kind of systematic risk which significantly affects the banks' ability to engage in OBSA. In the banks of South Asia, the exchange rate is highly volatile, as in Pakistan, the average weekly change against the dollar is positive and negative 5%. Thus, the reduction in the spread and increasing tax burden are affecting the cost efficiency of the banks in South Asia, which ultimately shrinks the net profit after tax. It is possible for the banks to manage the interest rate spread, which varies between bank to bank and country to country, subject to the systematic risk. This situation is raising some interesting but answerable questions on the role of systematic risks (arising from macroeconomic factors) faced by the banks of South Asia on their OBSA decisions.

This decrease of OBSA is raising certain questions on the rationale behind the decisions banks in South Asia to engage in OBSA. Under the market power theory, market portfolio theory, regulatory and tax theory and market discipline theory, which explain the banks' risk-taking behaviour, the current study highlights systematic risk, unsystematic risk and regulatory pressure being faced by the banks in South Asia and how it is affecting their off-balance sheet decisions. However, as one of the functions of OBSA discussed in the section is to manage the existing banking risks by either diversifying the market portfolio, increasing the market power, diverting the regulatory

pressure or managing systematic risk, it is therefore necessary to examine the persistence of OBSA over time. The results of dynamic panel data can provide the answer to this question. The size or power of the coefficient value between the dependent variable (OBSA) and the lag of the dependent variable can show the persistence of OBSA.

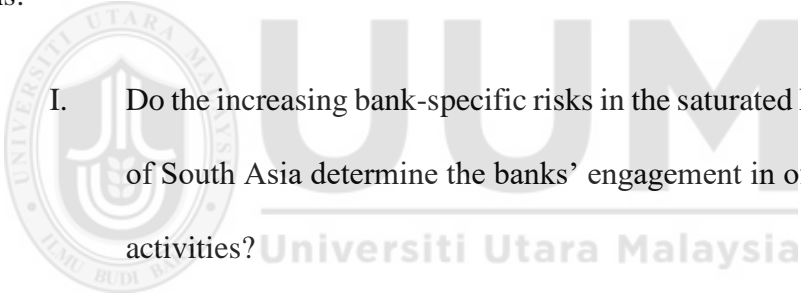
Every region has its geopolitical, economic, and legal status, which significantly affects the OBSA and because of these issues, the factors which affect OBSA vary from country to country and region to region. For example, given the differences between the banking system in Asia and the banking system in Europe, different factors affect the banks' decision to use OBSA in both regions. Most research on OBSA has been dominated by studies conducted in developed countries, such as the U.S. and in Europe. Even the many studies (Ekanayake & Wanamalie, 2017; Pushkala, Mahamayl, & Vankatesh, 2017; Aktan, Chan Zikovic, & Mandaci, 2013; Ahmad & Misman, 2012) carried out in developing and emerging economies, have concluded that the economic conditions, regulatory impositions and the market dynamics of each country are different from one other (Ahmad, 2007). The Banking sector in South is unique in many ways such saturated market, increasing bank specific risk and mounting regulation in poorly performing economies make these four countries as interesting sample of study. This study is therefore undertaken because of the fact that motivation and drivers of OBSA across countries could be different, and a theory that works in one country may not work in another. Thus, this thesis provides evidence concerning the determinants of OBSA of the commercial banks in South Asia. To the best of the researcher's knowledge, there is limited research on the issues related to OBSA in the banks of selected countries in South Asia, and there is no known study that has explored the

impact of bank- specific factors, bank regulatory changes and systematic risk on OBSA. Therefore, the study fills the gap in the literature.

After carefully reviewing the literature, the current study divides the factors which affect OBSA into three, namely, bank-specific factors, macroeconomic factors and regulatory factors, as many sets of variables can cause endogeneity issue. This study uses the fixed and random-effects model. In addition, the Arellano- Bond Dynamic Panel data regression analysis is applied for the confirmation of endogeneity.

1. 6. Research Question

Basing Based on the discussion above, this study answers the following research questions:

- 
- I. Do the increasing bank-specific risks in the saturated Banking market of South Asia determine the banks' engagement in off-balance sheet activities?
 - II. Is increasing regulatory pressure from in Banking industry South Asia bring about any change in their Off-balance sheet activities and to what extend?
 - III. What is the impact of systematic risk arising from key macroeconomic factors of selected countries in South Asia on the engagement in off-balance sheet activities?
 - IV. Are off-balance sheet activities persistent over time and if they are persistent, what are the possible reasons?

1.7. Research Objectives

The prime objective of this study is to investigate the determinants of OBSA in the commercial banks of South Asian countries and to investigate these determinants, the following specific objectives are examined:

- I. To analyse the impact of increasing bank-specific risks in the saturated Banking market of South Asia on the banks' engagement in off-balance sheet activities.
- II. To identify whether or not regulatory pressure in the Banking industry of South Asia determines banks' off-balance sheet activities.
- III. To estimate the effect of the increasing systematic risks from macroeconomic factors of selected countries in South Asia on the off-balance sheet engagement of their commercial banks.
- IV. To examine the persistence of off-balance sheet activities over time and the reasons behind its persistence.

1.8. Scope and Limitation of The Study

The scope of this study entails the parameters under which the study is carried out (Yücel, 2012). This study seeks to find solutions to the problems being studied which fit certain parameters. This study attempts to find the problems that arise in banks which influence their OBSA decisions. The scope of the study is limited to examining the impact of bank-specific factors (liquidity risk, credit risk, market power, capital, profitability, size and fee), bank-specific regulatory factors (CAR and reserve ratio) and macroeconomic factors (economic growth, level of exports, volatility in exchange rate, inflation and interest rate spread) on OBSA of the conventional banks of the selected

countries in South Asia, namely Pakistan, Bangladesh, Sri Lanka and India. The OBSA activities include guarantees, acceptance, letter of credit, performance bonds, trust funds, commitments, overdraft facilities and bill collection.

The reason why we have excluded the Islamic banks as one of the sample country India has not allowed the Islamic banks to operate. The scope of the country is limited to these four countries as the banks in these countries account for 90 percent of total Banking industry of south asia. Meanwhile, the Banking industry of these four countries is fairly well developed and interesting despite of mounting regulatory pressure and the engagement in OBSA has remained below than their regional counter parts i.e ASEAN, and Gulf as well as global banking industry.

1.9. Significance of The Study

The present study explains the behaviour of OBSA and their relationship with commercial banks' risk, particularly on the selected conventional banks in South Asia. OBSA are relatively new in the operations of commercial banks. Hence, more information is needed to understand their relationship with the commercial banks' risk, particularly in the selected conventional banks in South Asia.

A number of empirical works have been conducted on OBSA in the banking industry. There are studies that have investigated the link between non-traditional activities and risks (Boyd & Graham, 1986, 1988; DeYoung & Roland, 2001; Hidayat et al., 2012; Esho et al., 2004, Williams & Prather, 2010); some others have observed the relationship between non-traditional income and banks' financial performance (DeYoung & Rice, 2004; Lepetit et al., 2008); and others have focused on the determinants of non-traditional income (DeYoung & Rice, 2004; Rogers & Sinkey, 1999; Shahimi et al., 2006).

To get a better understanding about OBSA, the issues must be observed from various angles. As such, the present study investigates the issue of OBSA from more comprehensive dimensions, namely, the determinants of and the link between OBSA, regulations and risks. Therefore, this study looks into the bank-specific factors (such as capital, bank size, loan and advances, profitability, fee-based income, market power, credit risk and liquidity risk); bank-specific regulatory factors (such as reserve requirements and CAR); and the macroeconomic factors (such as economic growth, interest rate spread, inflation, volatility in exchange rate and exports) as key determinants of the OBSA of commercial banks in South Asia. This study is among pioneering studies, which provides details about the factors that determine the OBSA of the commercial banks in South Asia.

The major issues in the banking sector of South Asia are asset quality, liquidity risk, increasing regulatory pressure and worsening economic conditions. Moreover, the study takes a comprehensive set of factors to determine the effect of these bank-specific risks, bank-specific regulatory factors and macroeconomic factors to assess the impact of these on the banks' OBSA decisions. Therefore, this study would help in policy building to improve the quality of the asset and the optimal portfolio selection for income generation of the banks. The fact that this study includes the conventional banks in the South Asia as the sample of the study is significant. Therefore, it will provide insights into the different/similar impacts of these variables on the OBSA of the selected conventional banks South Asia, both specifically and generally.

This study extends the normal scope of banking studies in South Asia by comparing the determinants of OBSA among selected conventional banks in the South Asia. The outcomes of this study would be useful to formulate and enforce suitable policies and

strategies for the betterment of the banking industry in the selected countries in the South Asia. Furthermore, this study contributes to the literature by providing empirical evidence on the importance of regulations in managing bank risks.

Given the scope of the present study that covers selected countries in South Asia, it is expected that the findings contribute to the body of knowledge on banking and financial system in emerging markets. Unlike in developed countries, financial system in developing countries is dominated by banks. Capital market development in emerging market like South Asia is still in the early stage which suggests that commercial banks play a significant role in capital allocation. Due to the many factors, commercial banks in selected countries of South Asia are moving towards non-traditional activities. Owing to this condition, the phenomena need more explanation as most empirical studies done in developed countries cannot be generalised to the context of emerging market. Hence, the study on non-traditional activities in emerging market is a timely attempt.

Considering the fact that non-traditional activities are new to some countries, the regulators may not have adequate information on their impact on commercial banks performance. Despite this shortcoming, central banks even have encouraged commercial banks to expand to non-traditional activities. The downsides of non-traditional activities should be monitored closely to ensure prudential principle is practised by commercial banks. Therefore, a better understanding is needed by policy makers to regulate these activities. As for stakeholders of banks (i.e., depositors, bondholders, investors, shareholders, creditors), this study would be useful as it provides information on the influence of asset quality and portfolio optimization of income structure on insolvency risks in both conventional banks of South Asia. This

information would be important to potential bank creditors and debtors as it could assist them in choosing appropriate banks within the ability to deal with insolvency risk to ensure the safety of their deposits and high returns. Moreover, this study is beneficial to researchers as it helps to promote further research on the area of insolvency risk, specifically for conventional banks in South Asia . The findings of this study contribute new knowledge regarding the determinants of the OBSA in the banking sector of South, which has rarely been studied and discussed in banking literature.

1.10. Organization of the Thesis

This research is divided into five chapters. Chapter One provides a brief explanation of the thesis. This chapter consists of the introduction, research background, problem statements, research questions, research objectives, the scope of the research the significance of the study, and lastly the organization of the thesis.

Chapter Two provides the review of literature relating to the banks specific risk, regulatory changes, and OBSA. It also provides a review of the literature on the types of the OBSA. The relationship between each of the factor with OBSA is also subsequently discussed apart from the role of the overall risk. Finally, the theoretical lenses used for drawing the conceptual framework of the stud are also discussed in chapter 2

Chapter Three provides details of the methodology and techniques applied to collect and process the related data. Firstly, it describes the research framework development adapted for the study. Secondly, the mathematical model development is discussed. Next is the discussion of the research design sub-topic that provides information about the research design as well as sources of data, measurement of the variables and the diagenetic test used in the current study. Besides the above, this chapter also provides

the detail about the model development and econometric estimates employed to achieve the research objectives.

Chapter Four consists of the results of the data analysis, responses of participants and a summary of the findings of all the hypotheses. It is mainly based on preliminary data analysis and fixed effect and GMM estimates results. It presents the results of the hypotheses and provides a brief discussion on the findings.

Lastly, Chapter Five discusses the contributions of the research to the body of knowledge as well as to the practitioners. This includes the limitations of the study and the suggestions for future similar research. Figure 1.3 illustrates the systematic diagram of the contents of this thesis.



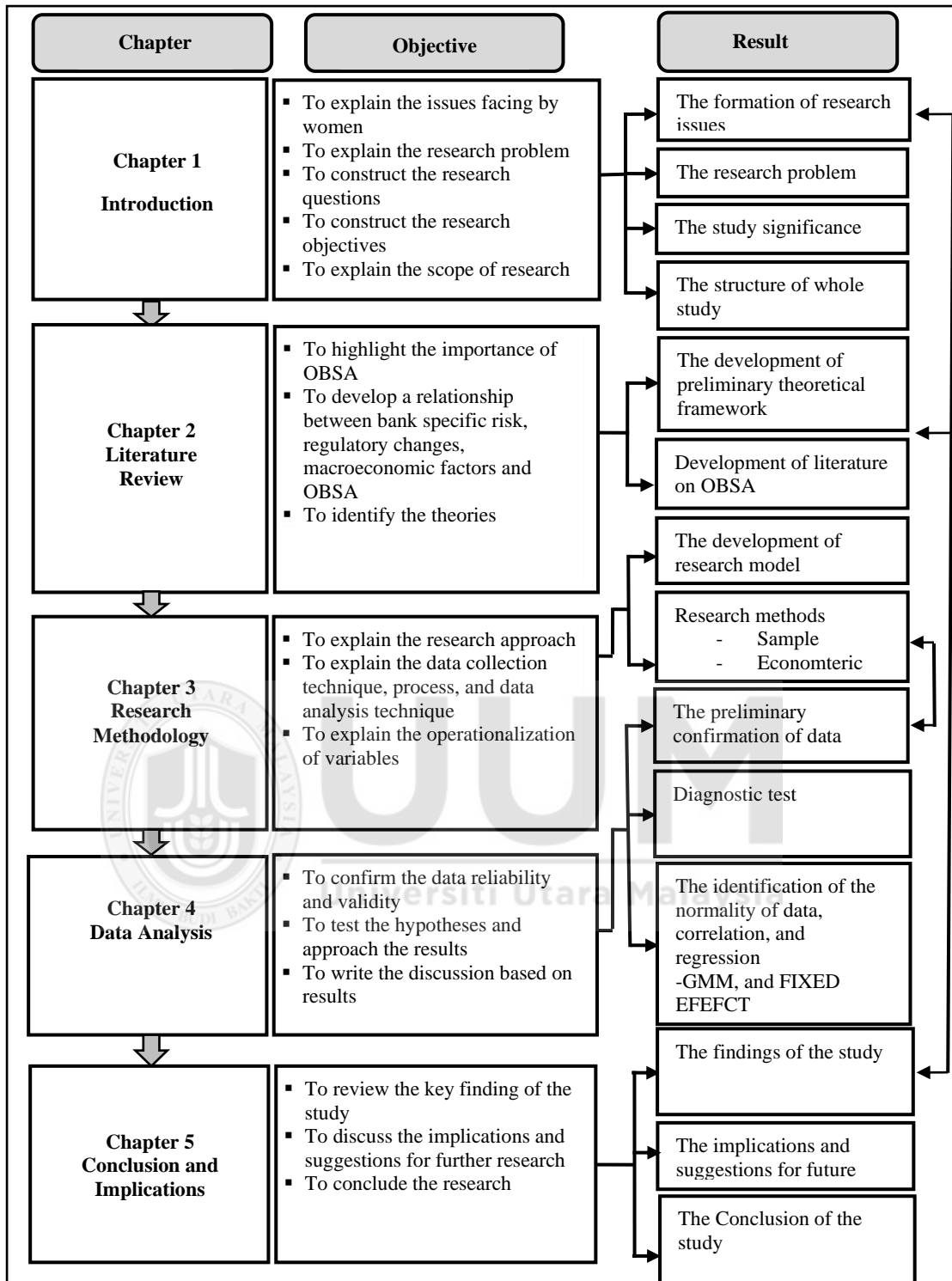


Figure 1.3: *Structure of the Thesis*

CHAPTER TWO

LITERATURE REVIEW

2.0. Introduction

Typically, banks are deemed as depository financial intermediaries that transfer funds from depositors (surplus units) to borrowers (deficit units). They also monitor the performance of borrowers in the best interests of the depositors, ensuring scheduled loan repayments. The calculation of bank profits entails the difference between the loan interests and the paid interests on the spread i.e. deposit accounts.

Given their crucial economic role, commercial banks initially played a key role in capital allocation as well, providing capital to private and household sectors. Commercial banks began to lose their dominance over the financial market due to the rise of disintermediation i.e. capital markets on top of other changes occurring at the global scale primarily deregulation, financial innovations, technological advances, and globalization (Canals, 2001; Matthews & Thompson, 2008).

More players (banks and non-bank institutions) have entered financial markets offering financial services that used to be exclusively delivered by commercial banks. This has caused a reduction in the commercial banks' profits (Rogers & Sinkey, 1999; Allen & Santomero, 2001; Mishkin, 2010). Owing to such push factors, commercial banks have been under intense pressure to find ways to improve their financial performance as well as to secure their positions in financial markets.

Consequently, the banks responded by engaging in off-balance sheet and high-risk conventional activities (Mishkin, 2010). This is based on the common wisdom that higher risks would generate higher returns, hence boosting profitability.

Nevertheless, this also means putting depositors' money at really high risks. As such, commercial banks began to be known as financial institutions that engage in risk management, fee-based and off-balance sheet activities (Allen & Santomero, 2001). Several inquiries have shown their dwindling involvement in conventional activities (Edwards & Mishkin, 1995) despite continuing to be a key player in the financial market in terms of GDP contribution (Allen & Santomero, 2001).

OBSA has been identified as an important solution in overcoming the issue of declining conventional activities as it can improve the financial performance of banks primarily in yielding higher returns with lower risks. This sentiment is also shared by banking supervisory bodies. However, several empirical inquiries such as DeYoung and Rice (2004) and Hidayat et al. (2012) highlighted the effect of non-interest income in increasing earnings variance i.e. the risks on earnings. Still, other studies have proven that OBSA can improve the financial performance of commercial banks with no adversative consequences (Wall, 1987; Brewer III, 1989; Rogers & Sinkey, 1999; Shahimi et al., 2006).

This chapter aims to review previous studies and policy reports on non-traditional activities in commercial banks. It is divided into the following sub-chapters namely: (1) type of OBSA, (2) theoretical review, (3) empirical literature on OBSA, (4) OBSA and risk, (5) determinants of commercial banks' OBSA, and (6) literature gap and chapter summary.

2.1. Off-Balance Sheet Activities in Brief

Off-balance sheet (OBS) Off-balance sheet (OBS) items are items of financial statements which are contingent and based on the outcome and of which can transform themselves into an asset or a liability (Ronen, Sa,under & Sondhi, 1990; Hull, 2012;

Saunders, 2014). However, the question arises about why a bank goes off the road and engages in such activities. The obvious reason for this is that the bank is trying to avoid the interest rate and other risks (Angbazo, 1997; Angbazo, 2008; Raz, Agusman, Gasbarro & Monroe, 2015; Barrell, Karim, & Ventouri, 2017). Meanwhile, OBSA expands the bank's operational scope and offers a gateway to a new source of earnings (Hou, Wang & Li, 2015). Forsooth, banks not only charge heavy fees on retail deposits, but also on loan guarantees, backup lines of credits and foreign exchanges (Hou, Wang & Li, 2015; Barrell, Karim, & Ventouri, 2017). Banks nowadays are even selling their loans to investors. OBSA can have a positive or negative effect on the bank's cash flow, and this does not mean that these activities are not accounted for (Saunders, 2014). These activities are not illegal and will appear in revenue statements, cash flow analyses, etc. They do not, however, appear on the balance sheet and the list of the bank's assets and liabilities (Saunders, 2014).

OBSA are activities which are not part of the bank's balance sheet; rather, they are mentioned in footnotes of audited annual accounts (Saunders, 2014). According to Nachane, Ray and Ghosh (2002), the OBSA are different from conventional banking activities and are contingent contracts which cannot be captured as an asset or liability. Simply put, the OBSA are not assets or liabilities, but rather contingencies which at the end can result in an asset or a liability. These activities are a fee income source for commercial banks and are not within the scope of the bank's balance sheet items (Barrell, Karim, & Ventouri, 2017).

The twenty-first century has brought many challenges to the global banking industry (Obay, 2014). One of these challenges is the earning of expected returns; banks nowadays are not making enough money (Casteuble, Nys & Rous, 2018). Despite all

the good news about positive returns, banks and financial institutions are in fact still struggling to achieve the desired rate of return (Bushman & Williams, 2015). Increased regulatory pressure, economic turbulence, and competition are major reasons behind this downward trend (Zahid, Anwar, Aqdas & Goraya, 2015; Kroszner & Strahan, 2014). These factors increase the banks' operating costs, which ultimately reduces profit and margins (Petria, Capraru & Ihnatov, 2015). To avoid risks arising from increased regulatory pressure, economic turbulence and competition, banks are spending a significant portion of their budget on the development of processes and systems that not only keep them in pace with escalating pressures, but also shelter them against economic turbulence (Elian, 2012; Ahmad et al., 2012; Ahmad, 2007; Hassan & Khasawneh, 2009; Nachanne, Ray & Ghosh, 2007). These challenges in the banking industry continue to escalate hence forcing the traditional banking system to constantly evaluate and improve its operations. Consequently, the recent decades have seen a rapid transition in the banking industry.

OBSA is defined by Rogers and Sinkey (1999) as all financial activities carried out by commercial banks that yield fee income rather than interest income including conventional activities such as credit lines and letters of credit (L/C). Derivative activities are also given special emphasis as derivative instruments are not categorized as OBSA except when they are used for brokerage and underwriting activities. Non-interest income is also utilized as proxy to denote the commercial banks' OBSA (Rogers & Sinkey, 1999; Perera, Ralston & Wickramanayake, 2014). The non-conventional income of banks is classified as fee income, income derived from fiduciary activities, and deposit service charges (Rose, 2002; Edirisuriya et al., 2019). Trading revenue is also identified by Stiroh (2003) as non-conventional income. The European report on the income structure of banks had outlined several elements of non-

conventional income i.e. derived from fee and commissions, derived from securities, as well as financial operations' net profit (loss) (European Central Bank, 2000).

In terms of financial services diversification, there are two groups of commercial banks i.e. universal and specialized (Yang, & Brei, 2019). A universal commercial bank provides more financial services as compared to conventional banking including investment banking, insurance, wealth management, as well as other fee-based activities. Universal banks also hold the equity stakes of non-financial bodies (Vennet, 2002; Yang & Brei 2019). Specialized commercial banks are depository financial intermediaries that offer conventional banking services and specific products to specific clients (Canals, 2001). Stiroh (2002) outlined two diversification types practiced by banks. The first is where commercial banks expand their financial services to include OBSA and is known as the “between” diversification. The second is where the banks provide more banking services varieties and is called the “within” diversification. According to Baele, De Jonghe and Vander Vennet (2007), a bank can carry out functional diversifications i.e. a conglomerate if it involves multiple financial services.

Financial ratios resulting from balance sheets are not a comprehensive indicator of the financial standing of a bank considering the trend of non-conventional and OBS activities. This means that balance sheets are not reliable in presenting a complete picture of the risk exposures of a bank (Mckee, & Kagan, 2018). Nowadays, several financial engineering methods are used to boost the financial performance of banks. For example, the positive outlooks of banks are being enhanced with the use of securitization. Before this, banks had to wait for a long time to receive full mortgage settlements (Du, Worthington & Zelenyuk, 2015) but with securitization, they can sell

their loan portfolios to other parties. This removes risky assets from the balance sheets, but not from the banks.

Given that derivatives trading and other OBSA are recorded on off-balance sheets (Dermine, 2009; Mckee & Kagan, 2018), they are used for inflating banks' capital ratios thus rendering it hard to determine the risk level bearable by a bank. It could also lead to the stakeholders' misinterpretation of the regulations, thus creating conflict between the regulatory bodies i.e. the Federal Reserve and the US Federal Deposits Insurance Corporation (FDIC) especially in assessing capital ratio (The Editorial Board, 2015). Inaccurate capital ratio estimation could result in the exaggeration of a bank's financial soundness, which demonstrates the regulatory bodies' inefficiency in measuring the bank's exposure to risks. Misinterpretations of a bank's capital soundness can potentially endanger the whole financial system as sufficient equity is highly crucial in ensuring a bank's financial stability.

In investigating the banks risk and macroeconomic conditions and determinants of OBS activities of banks, off-balance sheet activities which are the dependent variable in this study is defined as activities which are carried out by banks or any organization to generate additional income in the form of fees, but of which are not presented in audited accounts such as loan commitments' balance sheet activities that are measured in different ways by different studies (Mckee & Kagan, 2018; Campbell, Feagin, Downes & Utke, 2017).

The relationship between OBSA and risk is ambiguous i.e. the activities are carried out to reduce certain risks, but they have risks associated with them as well (Raz, Agusman, Gasbarro & Monroe, 2015; Waemustafa & Sukri, 2016). However, the net impact of these activities depends on certain bank-specific economic and regulatory factors

(Elian, 2012; Mckee & Kagan, 2018). These factors determine the cost and benefits of the banks' engagement in OBSA. In short, the OBSA are not assets or liabilities but rather contingencies which at the end can result in an asset or a liability. These activities are a free income source for commercial banks and are not within the scope of the bank's balance sheet items. As these activities are the outcome of recent developments in the field of financial engineering, some authors also termed them as non-traditional banking activities. These activities include financial derivatives (Forward, Future, Swap and Option), financial guarantees (Letter of Credit and Standby Letter of Credit) and financial commitment (Meng, Cavoli & Deng, 2017; Firth, Li & Wang, 2013; Du, Worthington & Zelenyuk, 2015; Lozano & Pasiouras, 2014).

2.1.1. Financial Guarantees: Financial Guarantee is defined as a non-cancellable indemnity bond insured by the banks or any other financial institutions which provides a guarantee to the other party that the payment principal and interest will be made by the banks (Paterson, 2015). The most common and widely used type of guarantee is a letter of credit. A letter of credit (LC) is a guarantee in the form of an underwritten insurance for payment to another bank and a commitment of lending to the customer (Alavi, 2017). Banks usually deal in two types of letters of credit i.e. a commercial letter of credit (CLC) (Davidson, 2017) and Standby Letters of Credit (SLC) (Dolan, 2016). Normally, both CLC and SLC offer the same type of risk exposure, but they are different in terms of level of severity of risk exposure (Ghasemi, Mallahi, Sadeghi & Hatamiasdabadi, 2016). The basic difference in terms of bank role for these two types of letter of credits is that in the former, the bank provides a guarantee to a third party and his bank that the payment will be made by the bank whereas in the latter, the bank also provides a formal guarantee of unforeseen contingencies which are severe and unpredictable with a higher level of default risk such as bond performance (Paterson,

2015). Both these financial guarantees not only enhance the operational scope of a bank, but also provide an additional service fee (Cowling, Matthews & Liu, 2017; Swain & Panda, 2017).

2.1.2. Financial Commitments: An agreement or promise or more broadly a contractual commitment in which a bank promises to lend a specific amount of loan at a specific date based on defined terms and conditions such as interest rate (Paterson, 2016; Hull, 2012; Saunders, 2014). The contract not only specifies the amount and deadline, but also the period within which the borrower can utilize this facility; the borrower's creditworthiness and collateral backing shape the features of this agreement (Conine, 2014). The commitments are categorized as an OBS item because the bank generates a fee income for contracting these agreements. However, although the OBS item generates fee income, it also increases the liquidity or credit risk (Paterson, 2016).

2.1.3. Financial Derivatives: The Financial derivatives are contracts or agreements which derive their value from underlying assets and are used to manage and mitigate different types of risks such as currency risk and forward exchange risk (Bacha, 2017; Hudson, 2017). Banks usually play two roles in derivative markets. Firstly, they use financial derivatives to diversify or mitigate their risks; in such case, the banks actively trade the financial derivatives for hedging purposes (Shen & Hartarska, 2018; Gupta, 2017). In addition to that, banks can act as dealers or trading counterparties with clients and charge a commission or fee (Abdel-Khalik & Chen, 2015). When banks use financial derivatives to expand their operations, it is probable that credit risk can arise (Norden, Buston & Wagner, 2014). The credit risk involved in such situation is related to the probability of the counterparty's failure in meeting the obligation which is commonly known as default risk (Banks, 2016). This risk relates to

the possibility that the counterparty to one of these contracts may default on payment obligations, leaving the bank unhedged and having to replace the contract at current interest rates, prices, or exchange rates, which may be relatively unfavorable (Subrahmanyam, Tang & Wang, 2014). Moreover, the likelihood of such defaults is high when the bank as a counterparty has money invested in the contract and is also losing heavily (Bessler & Kurmann, 2014). Because of non-standardization, the intensity of such default risk is higher for forwarding contracts than for future contracts. In forwarding contracts, payments are made at once and the terms are decided by mutual consent of the two parties entering into a contract through bilateral negotiation. Hence, these are over-the-counter agreements which offer no guarantee to either party (Bacha, 2017; Goldenberg, 2015). Meanwhile, the future contracts are standardized contracts which are traded on organized exchanges such as the Chicago Stock Exchange and New York Stock Exchange. In future contracts much like forwarding contracts, commitments are made between two or more parties and they are guaranteed by exchanges (Bacha, 2017; Goldenberg, 2015).

The options contracts are a type of derivative securities. They are a derivative because the price of an option substantially relies on the price of an underlying asset security (Bacha, 2017; Hudson, 2017). Unlike forward and future contracts, the option derivative does not grant the obligation of selling an underlying asset; rather, it just transfers the right of the selling or buying of an underlying asset at a certain fixed price on a specified future date (Chance, & Brooks, 2015). Options contract are tradeable in both OTC and exchange-traded markets. A standardized option such as bond option is traded on exchange whereas the customized option is traded in OTC. In both markets, the bank offers its dealing services and charges a commission. However, similar to

forward and future contracts, option derivatives also increase the banks' risk exposure (Hull, John & Basu, 2016).

The swap is another type of financial derivative which is specifically designed to exchange the cash flow. These are contracts in which both parties exchange financial instruments (Hull, John & Basu, 2016). The price of a swap is based on the underlying financial instruments such as foreign currency exchange rates, stock indices, and interest rates (Chance, & Brooks, 2015). The benefits in question depend on the type of financial instruments involved. In swap derivative, the two parties agree to transfer or exchange the interest rate foreign exchange payment. Swaps are OTC contracts which make them more susceptible to default risk. The loss or gain of both parties is linked with the fluctuation in some underlying financial instruments such as interest rate or foreign exchange rate (Quintino, Lourenço & Catalão-Lopes, 2016). However, in the context of OBS activities, the swap is another OBS item. Banks usually deal in currency and interest rate swap which acts as an intermediary for the interest rate of foreign exchange swap (Raz, Agusman, Gasbarro & Monroe, 2015). The primary role of these intermediaries is to trace and attract parties that are willing to participate in swap agreements. A bank charges its services fee for such activity. Swaps not only open a window for additional income, but also help banks in managing currency and exchange risks (Paterson, 2016).

2.2. Non-Traditional Activities in Different Region

This section examines the origins of non-traditional activities in various regions. Focus is mainly on the banking industry's growth in developed nations and developing Asian nations. The emphasis on developed nations serves to underline details of the history of non-traditional activities and the driving factors for their implementation in the business

of banking. As it is, non-traditional activities have been adopted around the world. This section aims to bring more insight about the extent to which banks in developing nations have adopted the developments in the financial industry of their developed counterparts.

2.2.1 United States of America (USA)

In contrast to the European market, the American financial market had adopted non-traditional activities much later (DeYoung & Rice, 2004). The reason for this is partly due to the unfavorable past experience of merging commercial and investment banking activities under one business organization just before 1933 (the universal bank model) (Canals, 2001; White, 2010). Following the 1929 stock market crash, the US Congress sanctioned the Glass-Steagall Act (GSA) which outlawed the involvement of commercial (investment) banks in investment (commercial) banking activities (White, 2010). The GSA primarily emphasized on separating the activities of commercial banking from that of investment banking (Gruson & Nikowitz, 1988). The US Congress introduced further obstructions for the universal bank model by enacting the Bank Holding Company Act, ruling out the detachment between bank holding companies and non-financial activities (White, 2010) together with insurance underwriting (Heakal, 2009).

The 1970s witnessed numerous endeavors by commercial and investments banks to remove the GSA's barriers in the US market, tracing back to the initiation of mortgage securitization by the Government National Mortgage Association (Ginnie Mae) and money market mutual funds (White, 2010). In the 1980s, as a response to the intensified competition, the banking industry began developing structured financial products (Freixas & Rochet, 2008).

Starting from the 1980s, loan and deposit shares in US commercial banks began to experience a decline, whilst non-interest income shares demonstrated an upward trend (DeYoung & Roland, 2001). Traditional banking services in the US were declining as indicated by the share of commercial banks to total non-financial borrowing and the share of banks' financial intermediary assets (Edwards & Mishkin, 1995). This statistic hence indicates that the GSA was not at all effective in preventing commercial banks from engaging in non-traditional activities.

Commercial banks responded to the decline in traditional activities by diversifying i.e. engaging in non-traditional activities and financial innovations. The margins of traditional activities had shrunk due to intensified competition. Income from traditional activities began to drop thus prompting commercial banks to diversify into non-traditional activities. Stakeholders meanwhile questioned the move to allow banks holding companies (BHC) to engage in non-traditional activities (Brewer III, 1989). The primary concern lies in the fact of whether the benefits of diversifying would prevail over the risks that come with it (Boyd, Graham & Hewitt, 1993).

Regardless of such apprehensions over non-traditional activities, the US financial market continued to diversify and innovate. According to White (2010), commercial banks had actually lobbied for the GSA to be revoked.

Soon after, the Gramm–Leach–Bliley Act (GLBA) was enacted in 1999 which allowed for the diversification of commercial banks and financial holding companies in the US (Stiroh & Rumble, 2006). Following the enactment of this new law, numerous other financial services underwent integration as well such as the combination of commercial banking, investment banking, insurance, and wealth management under one bank or financial holding company (FHC).

Although earnings can be improved by diversifying into non-traditional activities, there are still apprehensions with regards to unwarranted risks particularly in derivatives trading (Edwards & Mishkin, 1995). Additionally, commercial banks face a predicament with non-traditional activities which could be unstable in contrast to traditional activities (DeYoung & Roland, 2001). A number of empirical studies on the US financial market demonstrated that non-traditional activities carry a lot more risks as compared to traditional activities (Boyd & Graham, 1986; DeYoung & Rice, 2004; DeYoung & Roland, 2001; Stiroh & Rumble, 2006).

Despite the suggested shortcomings (Rajan, 2005), the rampant drive to make profits especially before the 2008 global financial crunch occurred had driven further financial innovations in unregulated financial markets (Ahmed et al., 2014). Such financial innovations particularly securitization were received well by investors, academics, and policymakers as well as the then Fed Chairman, Alan Greenspan (Reinhart & Rogoff, 2009). Securitization is one instance of a financial engineering approach utilized by commercial banks and financial institutions in mitigating their credit risk exposures. This approach – in the form of collateralized debt obligation (CDO) – had gained prominence before the occurrence of the subprime crisis.

With the motivation of risk removal within securitization, a more tolerant process of loan approval was practiced by commercial banks before the subprime crisis happened. The granting of mortgages with higher rates (subprime) to borrowers with bad credit records or those who refuse to reveal their assets and income became rampant (Wilmarth, 2009). As for commercial banks, the granting of more loans led to more revenues. Hence, commercial banks attempted to utilize their idle funds in full by distributing more housing loans without analyzing the consequences of doing so.

With securitization, commercial banks were able to convert high risk mortgages (or other loans) into marketable securities (Betz, 2018) particularly the CDO. Another key benefit was that commercial banks can lessen their capital charges (reserves) as enforced by the Basel Accord and divest their balance sheets of risky loans (Barnett-Hart, 2009). Securitization also enables commercial banks to advance more loans (Wilmarth, 2009).

Over the 2002-2007 periods, CDOs became highly prominent in the global market with a value of US\$ 1.2 trillion (Wilmarth, 2009). Major rating agencies gave these high risk asset-backed securities (ABS) CDOs the highest investment rating of (AAA) which made them look even more attractive (Barnett-Hart, 2009). And then there was the exponential growth of unregulated over the counter (OTC) derivatives in the form of newly structured financial products i.e. credit default swaps (CDS) and synthetic CDOs which were traded extensively in the financial market (Wilmarth, 2009).

High profit gains in the derivatives market halted once the Fed enhanced the benchmark interest rate to mitigate inflation in the US economy , (Hong, 2020).

Being made up of mostly adjustable-rate mortgages (ARM), the interest rate hike resulted in higher mortgage installments that most homeowners were unable to pay, thus leading to a spike in the number of non-performing home loans. Ultimately, the non-paying borrowers had to go undergo foreclosure on their homes and give up on their American dreams.

The situation became complex for banks and financial institutions owning CDOs and other toxic securities. With low liquidity in the financial market, banks were unable to sell relegated CDOs or repay investors by borrowing money (Hong, 2020). In short, the

increasing cases of non-performing loans affected the cash flows to the CDOs and other securities related to mortgage.

The seriousness of the situation escalated when the Bear Stearns, one of largest investment banks, underwent financial distress and requested for bail-out from The Fed in March 2008 (Morgenson, 2008). Bear Stearns soon filed for bankruptcy (The Federal Reserve, 2016) which caused alarm in the financial market for fear that other large financial institutions may undergo the same fate . The unfavorable market sentiment caused by the incident led investors to sell off their stocks in financial firms (Anderson, & Raimondo, 2008).

Soon after, the Lehman Brothers also underwent insolvency in September 2008, confirming market fears. However, the firm's request for bail-out to the New York Federal Reserve was rejected (Wiggins, Piontek & Metrick, 2014). In response to the Lehman Brothers' downfall, global stock indices abruptly dropped. In principle, a financial crisis was looming in financial markets worldwide.

Colossal failures of financial institutions during the global financial crisis raised cognizance on the shortcomings of non-traditional activities and financial innovations. Due to the disastrous effect of such financial crisis, scholars and law makers as well as the general public began to question the significance of non-traditional activities and financial innovations. Indeed, there had been misuse of financial innovation by bankers who used it for speculating in high risk financial instruments and unregulated derivatives market. The global financial crisis taught the industry that non-traditional activities and financial innovations had weakened the financial system rather than raise the efficiency and profitability of the financial market.

2.2.2. Europe

The universal banking model had been implemented by European banks far earlier than American banks. DeYoung and Rice (2004) pointed out that European banks are hence more experienced in managing non-traditional activities. They are also renowned for applying the universal bank model which offers and integrates numerous financial services.

The successful implementation of the universal banking model is exemplified by Germany. Johnson (1993) indicated three driving factors for the progress of the universal banking model in Germany i.e. the higher individual income, the termination of the interest rate ruling, and the expansion of German companies in other nations. The economy has long been dominated by Germany. Furthermore, a majority of the stock shares of giant companies are owned by three large German banks i.e. Deutsche Bank, Dresdner Bank, and Commerzbank (Canals, 2001). The Germany banking system is distinct because its commercial banks are permitted to appoint their executives on their supervisory boards. Additionally, the banks can vote and act on behalf of their depositors who own stocks in a company.

According to Vennet (2002), one of the most crucial determinants of the adoption of the universal banking model is the legal circumstance. The author adds that the model was made legal in Europe after the Second Banking Directive (SBD) was issued. Various allowable financial services are listed on the SBD including conventional banking services; leasing; investment banking; foreign exchange, securities and derivatives trading; wealth management; remittance; safekeeping; guarantee, and safe custody (Gruson & Nikowitz, 1988)

The European Central Bank's report on the income structure of EU banks indicates that the process of disintermediation had reduced the banks' distinct financial market position. In short, commercial banks have ceased to dominate traditional banking activities. Meanwhile, similar financial services can also be provided by non-bank financial institutions including pension funds, insurance companies, and hedge funds. Hence, the intensified competition faced by banks is not only from commercial banks, but also non-bank financial institutions.

Due to intensified competition and constricted margins, commercial banks in Europe had to undergo diversification by pursuing non-traditional banking services. Resultantly, the share of non-interest income to total income significantly increased from 28.3% in 1992 to 40% in 2003 (Goddard, Molyneux, Wilson & Tavakoli, 2007).

In terms of the effect of non-traditional income on bank income stability, Smith et al. (2003) indicated that diversification derives benefits from non-traditional activities. Specifically, non-traditional income can stabilize the revenue of European banks. DeYoung and Rice (2004) reviewed the findings of Smith et al. (2003) and proposed that, in the context of the European market, the outcomes are affected by the regulatory setting and the banks' structure. The authors suggest that European banks are accustomed to non-traditional activities, which is an advantage leveraged by the depository financial intermediaries in the country.

2.2.3 Asia (Japan, ASEAN, South Asia)

Just like Germany, the financial system in Japan is also dominated by banks i.e. based on the bank intermediation model (Canals, 2001). The country's economy is significantly driven by commercial banks which are closely related to non-financial firms. Typically, the holding structure comprises several companies that form an

industrial group (keiretsu) made up of numerous non-financial companies and one or a handful of commercial banks (Canals, 2001). Commercial banks in Japan not only fund the companies, but also underwrite securities, hold a share of the equity and appoint their executives to the companies' board of directors (Kutsuna et al., 2007).

According to Yafeh (2002), prior to World War II (WWII), a zaibatsu or a group of Japanese industrial companies held the shares of the subordinate first layer companies which in turn held the second layer companies. The author further explained that the zaibatsu at the time was aiding the Japanese forces during the war against the US.

Following WWII, the keiretsu was developed where each member company owns a certain share of the other member companies (Johnson, 1993). Commercial banks were responsible for fulfilling the financial needs of all the member companies being the key member in the keiretsu.

The banking industry in Southeast Asia has begun to engage in non-traditional activities. According to the Financial Stability Report of Bank Negara Malaysia (BNM), there has been an increase in the ratio of non-traditional incomes to gross operating profits among conventional and Islamic banks. Regulators perceive non-traditional activities as prospective income sources for commercial banks as a response to the financial market liberalization. Additionally, banks are encouraged to explore this new area. In the 2005 annual report of BNM, diversification was suggested among Islamic banks in Malaysia i.e. to venture into non-traditional activities with an emphasis on investment banking and other fee-based activities. As such, this strategic decision is hoped to enhance the Malaysian Islamic banking sector's market share.

Similarly, non-traditional incomes had helped improve the financial state of Indonesian banks following the 1997 financial crisis (Hidayat et al., 2012). The Indonesian

financial sector experienced growth during the recovery period driven by the assets of the capital market and finance companies as well as the decline in the ratio of commercial banks assets to the GDP. In view of the financial sector's developments, commercial banks in Indonesia pursued diversification in their financial services in response to the structural changes. Meanwhile, Bank Indonesia (Indonesia's central bank) suggested fee-based activities for commercial banks, which are then included as one of the many indicators of profitability (Hidayat et al., 2012).

Several South Asian nations including Pakistan, India, Bangladesh and Sri Lanka demonstrated their expansion into non-traditional activities through the achievement of higher non-traditional incomes. Following the global financial crisis in 2008, India demonstrated an increase in its ratio of non-traditional income to total income from 35.9 percent in 2009 to 42.6 percent in the first quarter of 2013. The intensifying competition in traditional activities had forced commercial banks in countries such as Bangladesh, Pakistan and Sri Lanka to engage in fee-based income activities which eventually resulted in a 20 percent hike in the banks' total incomes. In Pakistan, trading income significantly contributed to the rising trend in non-traditional income share among commercial banks which led to a hike in the banks' total revenues. Yet, central banks in key South Asian nations had cautioned against the possible shortcoming of the upward trend, stating that it may upset the financial system's stability when volatility hits the financial market. The OBSA of the nations in this region had already shown signs of decline.

2.3. Theoretical Review

The twenty-first century has witnessed a striking development in financial markets with increasing engagement of banks and other financial institutions in OBSA (Elian, 2012).

In recent years, especially after the Enron and world.com issues and the subsequent subprime crisis, capital markets have undergone regulatory and institutional reforms (Reid, Bocian, Li & Quercia, 2017). This increased scrutiny from regulatory authorities placed a significant negative effect on the profitability of banks (Acharya & Mora, 2015; Paulet, Parnaudeau & Relano, 2015). Meanwhile, financial innovation has opened many new windows for banks to generate additional income (Beck, Chen, Lin & Song, 2016). However, these innovations are not free from risk despite being tools for managing and mitigating bank-related risks. These innovations not only encouraged banks to broaden the base of their operative activities, but also helped them in introducing new and competitive products in the market (Jurman, 2005; Lozano-Vivas & Pasiouras, 2014). A segment of these products with a contingent nature and the ability to generate additional income from fees is known as OBSA.

McKee and Kagan (2018) argued that although the OBSA items are riskier, they can leverage banking growth with minor changes in the input. They further reiterated that banks prefer OB risks so as to avoid regulatory complaints. Meanwhile, the current risks along with the regulatory pressure upon banks are the key determinants of OBSA. D'Avino (2017) argued that the key determinants of the banks' engagement in OBSA are their existing competition level, market power, profitability and GDP.”.

Earlier researchers Edwards and Mishkin (1995), Ebrahim and Hasan (2004) and now Duca (2016) and Lee, Chiang & Chang (2016) argued that increasing pressure from regulatory forces and intense competition had forced banks to undertake OBSA. They further argued and confirmed the view broached by Jurman (2005) that financial development resulting from financial innovation is the main reason behind the improvement in non-interest-based income. Recent empirical investigations (Badia et

al., 2017; Ekanayake & Wanamalie, 2017; Rao, 2015) have shown that OBS items such as financial guarantees, commitments, and financial derivatives did not only emerge as additional sources of banking income, but also as the main sources of income in some cases.

Engagement in OBSA activities indeed helps a bank in generating additional revenue to trade off the loss of reserve and deposit requirements as they are not applicable to OBSA. However, one cannot deny the fact that OBSA is not risk-free and that these activities can involve market, operational and credit risks amongst others, which might affect the bank's solvency and liquidity. Hence, one can say that engagement in OBSA has certain costs and benefits. Prior studies (Meng, Cavoli & Deng, 2018; Du, Worthington & Zelenyuk, 2015; Lozano & Pasiouras, 2014; Perera, Ralston & Wickramanayake, 2014; Firth, Li & Wang, 2013; Karim, Liadze, Barrell & Davis, 2013; Duran & Lozano, 2013; Ahmad & Misman, 2012; Calmes & Theoret, 2010) have given plausible theoretical justifications in favor as well as against OBSA. Several competing hypotheses such as the diversification hypothesis, the moral hazard hypothesis, the regulatory tax hypothesis, and the market discipline hypothesis, have been used to explain the the reason behind OBSA. Commercial banks' strategy to engage in non-intermediation activities can be approached by the modern portfolio theory (Markowitz model). The diversification of commercial banks' assets is similar to the work of an investment manager who invests deposit funds on behalf of depositors (Fama, 1980). Similar to an investment manager, commercial banks operate in their best interest to ensure that the diversification of assets can produce optimum risk adjusted returns. Banks, in this regard, intend to achieve an efficient portfolio of assets that is characterised by the highest rate of return on a set of assumed risks (Mayo, 2008).

Moreover, the potential benefits of diversification can be found if the two assets are not perfectly positively correlated (Boyd & Graham, 1986).

Another concept that is relevant for explaining diversification in financial institutions is the economies of scope (Laeven & Levine, 2007a). A firm experiences economies of scope when it gains efficiency from producing different products. From the two concepts, we can see two different approaches in observing OBSA. The economies of scope puts more emphasis on cost efficiency and productivity, while the modern portfolio theory focuses on investing in multiple assets (portfolios) with different risk-return profiles to produce optimum returns.

2.3.1. Modern Portfolio Theory

Modern The modern portfolio theory is among the most influential theories of modern finance. The theory was developed by Harry Markowitz and published in 1952. The theory argues that investors or financial institutions can reduce risks by efficiently hedging the portfolio of financial instruments. This theory claims that diversification helps banks to reduce risks which ultimately lever the expected return. In risk management, a strategic move taken to add more investments, reduce risks associated with already included investments or generate an additional return is known as portfolio diversification (Schulmerich, Leporcher & Eu, 2015).

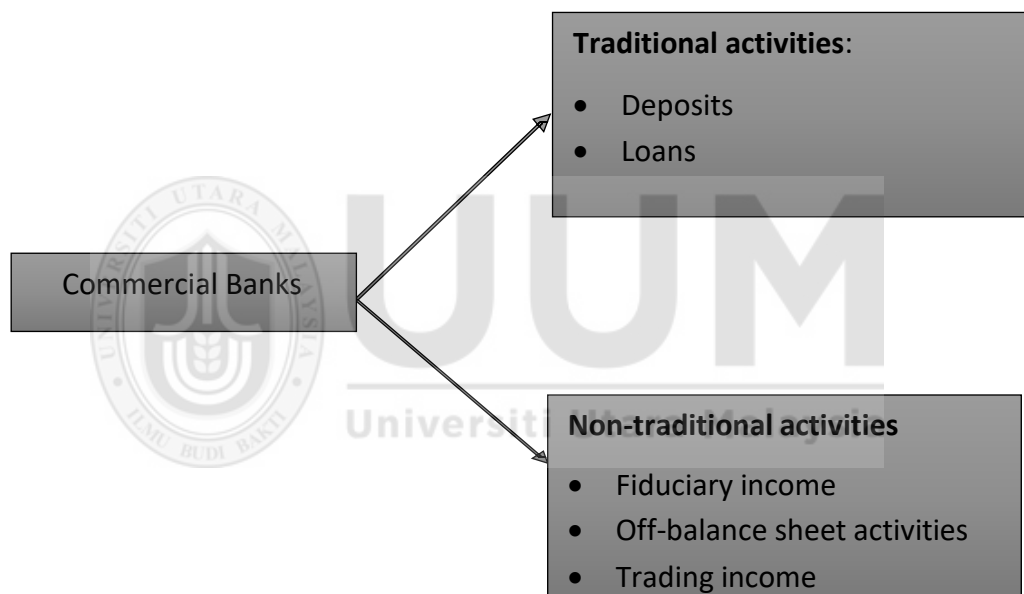
By implying the modern portfolio theory, one can argue that engagement with OBSA helps banks to diversify their portfolio risks. Hassan (1993) and Sun, Wu, Zhu, Stephenson (2017) highlighted that OBSA helps banks in creating an optimum portfolio which not only reduces the banks' risks, but also enhances the expected returns. They further argued that the banks' need and desire to diversify their loan and investment portfolio risks provide the incentive for undertaking OBSA. Sun et al. (2017) argued

that the portfolio theory is a strong justification by the banking sector for the aggressive undertaking of OBSA. They further argued that the increasing reliance on OBSA is because of the risks associated with the high volatility in income which is consistent with the portfolio theory. Similarly, Elian (2012) and Tahat and AbuNqira (2016) argued that banks engage in OBSA to manage their portfolio risks. Ekanayake and Wanamalie (2017) argued that OBSAs are individualistic and are not correlated and can be used to reduce bank risks. This argument is consistent with the portfolio theory by Markowitz (1952) which states that individual assets which are not fully correlated help firms to reduce their portfolio risks. Hence, it can be said that the market portfolio theory sees OBSA as a banking risk management tool (Ye, 2015).

Investor behaviour in asset selection can be explained by the modern portfolio theory. It can also be used on financial institutions that have selected their assets and the intricacy of the matter on their liability characteristics (Elton & Gruber, 1997). Based on the theoretical assumption of an unregulated banking industry, banks are deemed similar to other intermediaries especially open-ended mutual fund firms (Fama, 1980). Therefore, banks are basically financial institutions that acquire securities using depositors' money.

Following their evolution into becoming depository intermediaries, commercial banks now engage in activities related to risk management (Allen & Santomero, 1998; Rajan, 2005). Moreover, the conventional financial intermediation theory is not sufficient enough for explaining commercial banks' behaviour (Allen & Santomero, 1998). The banks' behaviour in terms of market risk management is explained by the model introduced by Pyle-Hart and Jaffee (Freixas & Rochet, 2008), which utilizes the mean-variance analysis for explaining the role of commercial banks as a portfolio manager.

With the decline in conventional banking business, commercial banks are forced to diversify. Multiple activities engagement is much like portfolio-diversifying investors whose target is to reduce their returns risks. The mean-variance theory introduced by Markowitz facilitates investors' selection of assets. The theory also indicates that portfolio creation is only possible within efficient boundaries (Mayo, 2009). Stiroh and Rumble (2006) suggested the following returns and variance for commercial banks with two-asset portfolios:



OBSA diversification is expected to improve commercial banks' profitability and lessen their exposure to risks. Based on the assumption of a negative correlation between conventional and non-conventional incomes, non-conventional activities can be seen as a positive replacement for conventional banking activities. Based on the modern portfolio theory, a minimum variance (risk) on assets returns is projected when

the two types of activities are combined. The lower standard deviation can also lead to better risk-adjusted returns

The modern portfolio theory argues that banks diversify their income sources to mitigate risks; therefore, the main purpose of performing OBSA is to manage banking risks (Ye, 2015). Because of their effectiveness in managing the default, forward exchange and growth risks, banks nowadays are aggressively carrying out OBSA and in some cases they even overweigh the bank on balance sheet items (Ye, 2015). Larger banks are assumed to be safer with low risks and sustainable growth. It is argued that when bank size increases, the bank risk decreases and thus offer fewer incentives for the banks to engage in OBSA (Khasawneh et al., 2012; Elian, 2012). Therefore, the proposition of the modern market portfolio theory regarding the relationship between bank size and OBSA is negative. The modern portfolio theory views that when a bank loan increases, the bank credit and total risk would increase as well (Khasawneh et al., 2012; Elian, 2012). The increased credit and bank risks make diversification more beneficial and offer more incentives for engagement in OBSA. The net profit of banks is a critical determinant of diversification (Khasawneh et al., 2012; Elian, 2012; Ma'in et al., 2015). A decrease in the net income of any bank decreases creditworthiness which in turn offers an incentive for diversification and encourages banks to engage in OBSA to increase their net income.

Efficient banks are those that are producing maximum output from their assets. Such banks also attained the economies of scale and economies of scope (Ayadi, Arbak, Naceu & Groen, 2015). However, if the banks are not using their assets optimally, efficiency issues will occur which increase bank risks and offer more incentives for diversification from traditional income sources (Ayadi, Arbak, Naceu & Groen, 2015).

Market concentration reduces competition and bank risk (Phan & Daly, 2016). In theory, a more saturated market denotes more market power and lower competition; this in turn indicates lower bank product diversifications associated with OBSA (Choi, Fedenia, Skiba & Sokolyk, 2017).

2.3.2. Economies of scope

Cummins, Weiss, Xie and Zi (2010) highlighted economies of scope as a crucial financial industry matter and is considered as a firm basis for another significant corporate step i.e. diversification (Economist, 2015). By diversifying financial activities, large commercial banks can exploit their massive capability to yield the best returns. Towards achieving that objective, the banks can also offer various financial products to a larger base of customers. Dermine (2009) outlined two kinds of economies of scope i.e. cost-based and revenue-based. The former emphasizes on the cost-wise efficiency of creating diverse financial products, whilst the latter focuses on cross-selling various financial services to existing customers.

While the modern portfolio theory focuses on a portfolio's risk-adjusted returns, economies of scope emphasizes on the cost viability of making available various lines of products; this could be achieved from shared fixed costs, expertise and the cross-selling of various financial products. This means that a bank can gain lower average fixed cost when it adds more financial products to its repertoire, thus leading to higher profitability.

Another practical strategy is cross-selling which entails the selling/promotion of various financial products to current customers. It is common for large commercial banks now to provide diverse financial products covering deposits, mutual funds, unit trusts, investment brokerage services, and wealth management. This makes commercial banks somewhat similar to hypermarkets. Hence, banks can capitalize on their massive size to generate as much revenue as possible from current and new customers.

2.3.3. Regulatory and Tax Theory

The regulatory tax hypothesis and reserve requirements impose an additional cost which ultimately reduces banking profit (Ashraf, Arshad, Rahman, Kamal & Khan, 2015). To avoid the costs and risks arising from tax regulation and capital and reserve requirements, banks prefer to engage in OBSA (Elian, 2012). In fact, the costs involved in fulfilling the requirements of capital reserve and holding non-interest-bearing reserves increase a bank's cost of funds more than what a non-bank is required to pay. Hassan (1991) argued that the amount of OBS items is linked directly to regulatory and tax cost. He further argued that increasing regulatory and tax pressure offers additional incentives for banks to engage in OBSA.

The tax and regulatory hypothesis argue that the regulatory pressure on the firms' on-balance sheet items activities is a major reason behind their increased engagement in OBSA (Mahoney, Crook, Tully, Strafaci, 2017). The regulatory impositions can be in many forms such as reserve requirements, capital requirements, and deposit insurance premium. According to Ahmad (2007), the tax regulatory hypothesis predicts a positive relation between OBSA and regulatory and tax requirements. Santos (2011) carried out a study on the impact of growth drivers and regulatory pressure on OBSA undertaken by Philippine commercial banks using dummy variables and found that regulatory

pressure has a positive relationship with the OBSA of commercial banks. However, many prior findings such as that of Ahmad (2007), Ahmed and Hassan (2009) and Ahmad et al. (2012) rejected the predictions of the regulatory and tax hypothesis and argued that the hypothesis has no significant impact on the usage of OBS items.

Capital requirement is a regulatory imposition by the central bank of the country and is measured in capital adequacy ratio (Mathuva, 2009). In capital requirements, to protect the depositors' deposit and to ensure the stability of the banking sector, banks are advised to hold a buffer of capital (Cohen & Scatigna, 2016; Demir, Banu, Tomasz, Michalski & Ors, 2017; Moreira & Savob, 2017). Generally, it is argued that banks with a greater volume of risky assets should retain a higher buffer of capital. An undercapitalized bank will face excessive costs of accessing capital while an overcapitalized bank will face opportunity costs of holding an excessive amount of capital. All on-balance sheet or traditional banking activities are under capital reserve requirements (Moreira & Savob, 2017). Since OBSA is free from regulatory pressure and to avoid risks arising from increasing regulatory pressure, banks are hence increasing their engagement in OBSA (Elian, 2012). Thus, following the regulatory and tax hypothesis and the market discipline hypothesis, it can be argued that capital reserve requirement is determined by the OBSA carried out in the commercial banks of any country.

2.3.4. Market Power Theory

Market The market power theory claims risk status of an institution as a major determinant of OBSA (Khasawneh & Hassan, 2010; Elian, 2012; Al-Tahat and AbuNqira, 2016). This indicates that banks that are enjoying growth and safety issue greater volumes of OBS items than the riskier banks (Elian, 2012). This hypothesis

claims that the OBS items are not insured and the claims on these activities are contingent on other claims on the bank. Many prior studies such as that of Ahmad et al. (2012), Ahmad and Hassan (2009) and Ahmad (2007) provided support to the market discipline hypothesis and indicated that profitable banks engage more in OBSA than poor performing banks. OBSA are activities used as a risk mitigation tool by banks, but at the same time, these activities of contingent nature can transform themselves into a source of additional risks (Elian, 2012). Therefore, we can say that OBSA is very risky and that their associated risks can transform them into an opportunity or a threat. For example, guarantees which are a source of an additional income also add the risk of future payments even in acute stress situations or unfavorable circumstances (Hull, 2012; Saunders, 2014).

According to the market power theory, the OBSA are uninsured and contingent activities (risk behavior related to other claims on the bank) and that the banks in safer position will engage in any such risky activity (Khasawneh & Hassan, 2010; Elian, 2012; Al-Tahat and AbuNqira, 2016). Whereas the modern portfolio theory considers OBSA a risk management tool and justifies their overweighted figures as a trade-off between the risk of losses arising from interest-based or conventional banking activities. The economies of scale and economies of scope are used as the emanators of bank diversification decisions in the market portfolio theory. According to the market power theory, the growth in bank assets helps the banks in attaining economies of scale and reducing risks and that they may engage in OBSA to earn additional incomes.

The increasing level of loans offers an ambiguous relation to OBSA. The market power theory presents two conflicting views. According to one view, the increase in total bank loan will bring economies of scope which in turn offers more incentives for engaging

in OBSA (Khasawneh & Hassan, 2010; Elian, 2012; Al-Tahat and AbuNqira, 2016). Meanwhile, the increasing level of the loan will also increase credit risk causing OBSA to be less attractive. Net loan ratio which is a measure of maturity mismatch between asset and liability and net loan written off which is an alternate measure of non-performing loan place a significant impact on the relationship between the level of loan and OBSA. According to the market power theory, if the net loans and net loans written off are experiencing a decrease, then the increasing total loans will be less risky and offer more incentives for engaging in OBSA (Khasawneh & Hassan, 2010; Elian, 2012; Al-Tahat and AbuNqira, 2016). This is in line with our second argument that the increasing amount of performing loans diverts banks from risky OBSA. The market power theory views bank profitability and efficiency as levers of diversification. If a bank is operating efficiently and is earning high net income, then it should engage in OBSA (Islam & Nishiyama, 2016; Sinha, 2005; Lieu, Yeh & Chiu, 2005).

2.3.5. Market Discipline Theory

Market The market discipline theory postulates that buyers and sellers in a market are constrained by market discipline in setting prices because they have strong incentives to generate revenues and avoid bankruptcy. This means that in order to meet economic necessity, buyers must avoid prices that will drive them into bankruptcy and sellers must find prices that will generate revenue. According to the postulation of the market discipline theory, the safer banks tend to issue more OBSAs than the risky banks. According to the market discipline, the OBSA are of contingent nature and banks following market discipline will only engage in them once the market regulations allow them to do so (Ahmad et al, 2012; Ahmad & Hassan, 2009; Ahmad, 2007).

The proposition of the market discipline theory basically supports the view that all market players should promote the transparency risk disclosure as all the institutions work under the guidelines of the recommended regulatory framework and promote regulated market disciplines. Thus, the theory offers a contradiction to the proposition of the regulatory and tax theory which argues that the regulatory cost arising from increasing regulatory requirements is the biggest factor that affects the diversification decisions to undertake OBSA.

2.4. Empirical Literature on OBSA

In the past three decades, the financial sector has transformed and has been subject to numerous financial innovations as well as played a significant role in economic growth. These innovations, in conjunction with securitization and financial derivatives, include a considerable expansion in the range and scope of the fee-based forms, off-balance sheet (OBS) businesses which causes a shift from traditional intermediary credit functions to more marketable credit instruments. Consequently, banks started offering a wide range of fee-based products including financial contracts which are termed as off-balance sheet items. The increasing regulatory pressure and decreasing profit margins from traditional banking activities motivate banks to increase the volume of their OBSA. OBSA however is still a new and emerging research area with very few related literatures. In this section, we have presented a detailed review of the literature in chronological order. Industry stakeholders hold the common belief that non-conventional fee-based activities can boost the revenue of commercial banks with lower risk exposure (DeYoung & Roland, 2001).

It also targets to endorse the commercial banks' revenue diversification (BNM, 2006). But the intention to improve income via OBSA is not reinforced by the vigilance on

latent risks. Hence, OBSA support which only focuses on returns and neglects the risks could prove to be deceptive. Empirical inquiry is therefore needed to substantiate it.

Benvenuto and Berger (1986, 1987) carried out studies on the issues of a standby letter of credit. In their study, they claimed that SLC is an instrument that offers insurance to the depositors' deposited and uninsured sequential claims, and a maintain that as banks approach failure. They also claimed that as banks approach financial distress, the SLC insurance decreases. Despite an in-depth analysis of SLC, the authors provided no details about the detriments of SLC or considered regulatory and economic pressures in their studies. Avery and Berger (1988) supported the moral hazard hypothesis when they highlighted that banks' risk exposure and SLC have a positive correlation.

Continuing the effort in exploring the issue of SLS in commercial banks, Pavel (1988) studied the link between SLC and banks. The author found that bank risk has no relation to SLC. However, the study on SLC had just begun at the time and up until 1988, no studies had been carried out on the full set of OBSA or on the regulatory pressures which affect these activities.

Koppenhaver and Yoder (1989) were among the pioneers who studied the impact of regulatory pressure on banks' engagement in the guarantee market. They were also among the pioneers who had used a large set of variables from the guarantee market (loan commitments, SLCs and CLCs). They explored the link between regulatory pressure and bank participation in the guarantee market by using the logit regression model. The findings of the study revealed that the regulatory factors such as reserve requirements have a significant impact on the banks' engagement in the guarantee market.

Berger and Udell (1990) studied the link between different products of guaranteed markets and bank risks. In their study, they found that loan commitment helps in diversifying bank risks. Continuing this work, Avery and Berger (1991) added more measures for bank risk and found that SLC has a positive impact on bank risk particularly for large banks. The findings of the study show consistency with the market discipline hypothesis. Berger (1991) continued and added another investigation to the literature with a study on the market discipline of the banking industry. In this study, instead of using stock market prices, the author used actual bank performance to determine its relationship with the banks' risk taking. It was found that capital ratio has a significant positive impact on bank earnings, which means that a higher capital ratio leads to better future earnings. However, higher capital ratio was negatively related to bank profit and positively related to bank performance.

Koppenhaver and Stover (1991) broached another argument and said that the relationship between SLC and bank capital could be captured using the simultaneous equation modeling and that existing literature on SLCs has simultaneous equation bias. He took the view that because of revised capital standards, banks are increasingly engaging in OBSA which not only gives them additional income, but also helps them to convert their risky assets into less risky assets. In addition to that, they employed the Granger causality test. The findings revealed that SLCs have a positive impact on bank capital whereas capital has a negative impact on SLCs.

Using the stakeholder perspective, Hassan (1993) studied the relationship between risk and commercial letter of credit (CLCs). Hassan (1992) categorized the stakeholders into stakeholders and bondholders. The result of the study suggests that the stakeholders consider CLCs as a tool for reducing bank risk whereas the bondholders were

indifferent about the role of CLCs in bank risk management. The author further argued that capital requirement causes some constraints which make some OBSA inappropriate for large commercial banks.

Hassan, Karels and Peterson (1993) studied the link between OBSA and bank subordinated debt by employing the contingent valuation model and basing their study on the market discipline hypothesis. Their findings were consistent with the market discipline hypothesis. The results suggest that both the equity and debt holders of banks consider OBSA as a risk reducer. Although this is a pioneering study in the field, no attention has been given on the issue of risks associated with OBSA.

Continuing the stream of research on OBSA, Hassan (1994) carried out another study on the issue of OBSA and bank risk. He studied the link between OBSA and the market risk of large commercial banks operating in the US. The findings of the study showed consistency with the market hypothesis that OBSA helps large commercial banks in diversifying their market risks. The author further argued that with its significant contribution to the reduction of market risk, OBSA also plays a significant role in reducing the overall risk. However, he concluded that as OBS items are not the concern of well-diversified stockholders, the OBSA have no impact on the systematic risk of banks.

Following the work of Hassan (1993), Chaudhary (1994) also studied the link between OBSA and market risk. However, his study was distinct in two ways. Firstly, to achieve the research objectives, he used the two-stage model. Secondly, he conducted a comparative study between large and small banks. His findings were consistent with the findings of Hassan (1993) which supported the market discipline hypothesis. They

found that in the US, large commercial banks are more efficient and well diversified in managing and mitigating risks than the smaller banks.

Jagtiani et al. (1995a) broached an interesting yet important argument that the inclusion of OBSA in bank portfolios has little or no effect on the overall economies of scale. In another study, Jagtiani et al. (1995b) found that regulatory pressure in the form of increasing capital requirements have an insignificant impact on the implementation of OBSA. Angbazo (1997) later argued that OBSA are sensitive to credit risk interest margins and default risk.

The dawn of the current century has witnessed some significant contributions. Hassan, Lai and Yu (2002) studied the link between risk and bank letter of credit using various unifactorial and multifactor measures of market risk. The findings of their study indicate that the letter of credit and market measures of risk are negatively related. Khambata and Hirche (2002) carried out a pioneering study which demonstrated the association between internal risk and OBSA. In the study, they focused on the credit risk of OBSA. The study was carried out on a sample of 20 European commercial banks. The results of the study gave some interesting insights on the issue. Loan commitments appeared as the largest source of credit risk whereas derivatives make up 95 percent of the total OBSA.

Later, Nachane, Ray and Ghosh (2002) carried out a study on the determinants of OBSA in India. Using pooled OLS, they found that bank size has a positive relation with OBSA whereas a high level of capital and liquid assets provides less or no incentive to engage in OBSA. However, in their studies, only a limited number of factors were examined. Therefore, they carried out another study (Nachane & Ghosh, 2007) in which certain bank-specific regulatory and macroeconomic factors were

included which can affect the OBSA of commercial banks. In their findings, they reported that all three factors i.e. bank-specific factors, bank-specific regulatory factors, and macroeconomic factors have a positive effect on OBS engagement.

Sinha (2005) studied the exposure of Indian banks to off-balance sheet activities. The study was divided into two sections. The first section used the data development approach where he compared the income-generating efficiency of the banks from OBSA during the post-reform period. In the second section, with the aid of a panel data framework, the author studied the relationship between the banks' specific factors (such as operating efficiency and non-performing loans) and bank-specific regulatory factors (i.e. capital adequacy ratio) with the risk-taking behavior (OBSA exposure) of Indian commercial banks. Using the data development approach, he found that Indian private banks are more engaged in OBSA and generate more income out of it. The results of the panel data provided support to the market discipline hypothesis. The relationship between NPA and OBSA appeared negative whereas that between operating profit and OBSA positive. However, the study did not incorporate any measures for market risk or bank-specific risk. The OBSA exposure was used as the only proxy for bank risk taking behavior. Later, Nachane and Ghosh (2007) carried out a study to trace the determinants of OBSA in the Indian banking sector. He found that risks arising from banks specify factors such as non-performing loans, systematic risk especially from interest rate spread and regulatory pressure as the key determinants of OBSA in the Indian banking sector.

Lieu, Yeh and Chiu (2005) carried out a study on the issue of OBSA and their impact on the cost efficiency of Taiwanese commercial banks. Using a stochastic cost curve, they examined the cost efficiency of Taiwanese commercial banks with and without

OBS output. The study found that when the OBS output is excluded from the cost efficiency measurement, the cost frontier function shows a 5 percent underestimation in the banks' efficiency. Hence, OBSA has a significant impact on the cost efficiency of commercial banks in Taiwan. In addition, they also studied the link between certain bank-specific factors such as bank size, market concentration, economies of scale, economies of scope and non-performing loans with OBS usage and the banks' cost efficiency. The results of the study show that bank size has a negative relationship with OBS whereas market concentration has a positive relationship with the cost efficiency of the Taiwanese commercial banks. The impact of economies of scale on cost efficiency is observed for both models. It was found that the OBS helps the commercial banks in achieving economies of scale. The economies of scope between OBS output and loans was also observed, and the authors concluded that the economies of scope between loans and OBS outputs are practical.

Angelidis, Lyroudi and Koulakiotis (2005) studied the relationship between OBSA and the productivity of decision-making units of banks in European countries. The sample of the study was banks from 11 European countries. The data was collected from the annual reports of the banks spanning 8 years i.e. from 1996 to 2002. Using the data development approach, the authors calculated the Malmquist indices of the total factor productivity change. They found that the inclusion of OBSA items has no significant impact on the productivity of European commercial banks and that the exclusion of OBSA as an additional item provides a better fit. However, the findings cannot be generalized as the study had overlooked so many factors such as total bank productivity which is measured as a product of technological change index and technological efficiency change index.

Calmes and Liu (2009) carried out a study on the Canadian banking sector and argued that banks increase their focus on fee-based income due to increasing regulatory pressure. The authors found that the increasing involvement of the Canadian financial intermediation industry in OBSA is giving rise to operating income. Meanwhile, Calmes and Theoert (2010) studied the impact of OBSA on bank returns and provided support to the arguments broached by Calmes and Liu (2009). They argued that although the recent studies did not show that the increase in OBSA engagement provides income diversification benefits, the income of OBSA indeed affects bank returns positively. Zhao and Moser (2009) argued that the engagement in OBSA such as derivatives helps a bank in managing and mitigating interest rate risk and increasing performance.

Lozano-Vivas and Pasiouras (2009) argued that the cross-country differences in regulatory and macroeconomic environment have a significant impact on OBSA and on banks' productivity. Khasawneh et al. (2012) studied the determinants of OBSA for Jordanian commercial banks. Using the panel data analysis and deploying the logistical model introduced by Mansfield (1961), they considered OBSA as a financial innovation which follows a chronological spread curve. However, they modified the model by incorporating regulatory and non-regulatory factors of the bank and macroeconomic factors such as real GDP, inflation and interest rate spread. The findings of the study revealed that the regulatory factors are the most important determinants of OBSA.

Elian (2012) was among the first to carry out an in-depth study on the factors which affect OBS usage in commercial banks. The sample of the study was banks in GCC countries. The author used a comprehensive set of factors which comprise bank-specific factors such as market power, bank size, profitability and proportion of borrowing as

well as bank-specific regulatory and macroeconomic factors such as real GDP, capital adequacy ratio, real GDP and macroeconomic policies. The result of the study revealed that the banks' specific factors as discussed above play a significant role in the banks' OBS engagement whereas among the bank-specific regulatory and macroeconomic variables, real GDP and regulatory pressure pose a significant impact on OBS engagement.

Alsabbari and Hadi (2012) broached an interesting yet very important argument. They argued that banks usually avoid excessive engagement in OBSA and that the loose control on OBSA is the biggest reason for the banks' excessive engagement in these activities. Elaborating on that argument, Aktan et al. (2013) argued that OBSA is not risk-free. They highlighted that although OBSA provides a window for more operative income, excessive engagement in OBSA brings an additional layer of bank risk.

Credit risk is also among the key determinants of OBSA. Scopelliti (2013) carried out a study on US commercial banks and investigated the link between growth in lending and OBSA credit risk using a fixed effect panel data methodology on a sample of 39 banks. The results of the study show that OBS credit risk has a negative effect on lending growth. Additionally, the author studied the variation in results on short-term and long-term lending, and interestingly found a positive relation for long-term lending and negative relation for short-term lending. Buckova (2012) studied credit risk management arising from OBSA in the Czech banking sector and found that the credit risk arising from OBSA has a significant but manageable impact on OBSA.

Rose and Hudgins (2013) indicated several reasons for the growing trend of non-conventional activities i.e. to complement conventional fund sources, to lessen production costs, to drive cross-selling, and to minimize total risks. One of the factors

that reduced the dominance of commercial banks in financial markets is the lower cost advantage (Mishkin, 2010). Commercial banks have a hard time attracting depositors due to high competition with other financial institutions especially insurance firms and mutual funds, causing them to lose out on low-cost deposits. Due to insufficient deposits, the banks are unable to channel loans thus leading to dwindling interest income and net profit.

Commercial banks responded to this situation by diversifying to OBSA. They extended their role beyond being a conventional financial intermediary on top of tapping on a number of unexplored arenas such as capital markets, fee-based activities and OBSA. Such diversifications are also driven by the banks' desire to maximize their capacity. Several large financial institutions are the product of mergers and acquisitions that took place following the 1997 Asian financial crisis. The Indian and Pakistani central banks were instrumental in initiating the mergers of banks towards establishing massive and solid financial institutions, which represent the universal bank model that diversifies more than smaller banks. Due to their greater capacity, large banks can provide various financial services and have wider access to local and regional markets.

Teixeira (2013) in an attempt to explore the determinants of OBSA among European banks found that risk management strategies by banks and their liquidity have no link with OBSA. However, the author argued that the liquidity is seen as a major determinant of the banks' decision to engage in OBSA in Europe. Perera, Ralston and Wickramanayake (2014) studied OBSA in South Asian countries and found that the one year lag of OBSA market power, GDP, capital liquidity risk size, credit risk and profitability has a significant impact on the OBSA of South Asian banks. Papanikoaou and Wolff (2014) found that Indian banks with OBSA are carrying more risks than

banks with lesser or no OBSA. Chiou and Porter (2015) provided support to the market power theory and argued that banks with higher capital are in better position to engage in OBSA as these activities are riskier and increase capital risk.

Cheng, Fung, Hu, Cheng (2015) studied the link between interest rate deregulation and OBSA in Hong Kong. They also presented an in-depth analysis of banking deregulation and bank risk-taking behavior. The authors confirmed the view that the regulation and deregulation process of bank interest has a significant impact on the development and usage of OBSA in commercial banks in Hong Kong. They presented two contradictory views: one is that the deregulation of interest increases competition which ultimately leads to growth in OBSA. The second view states that increased deregulation and competition may reduce the banks' capability and offer a constraint in the adoption of OBSA. However, the findings provided support to the first hypothesis that interest rate deregulation has a significant positive impact on OBSA and bank risk-taking behavior.

Zhang, Xie, Lu and Zhang (2016) carried out an interesting study on the issue of financial distress in large financial institutions. They used two variables as proxy for financial distress: one for the distance to default (DD) and the other for the Z-score. OBSAs were among the factors they considered as responsible for financial distress. In their study, they found that OBSA has a negative impact on both Z-score during pre-crisis period and DD during the post-crisis period. Their findings showed a great deal of agreement with the view broached by Karim et al. (2013) who claimed that OBSA is one of the main reasons causing financial. Also supported is their claim that after 2003, the OBSA enhanced the probability of a crisis which continued until the bubble burst. Similarly, Uzoma et al. (2016) argued that OBSA and bank profitability have a

significant relationship; however, excessive engagement in OBSA leads to higher bank risk.

Tahat and AbuNqira (2016) studied the impact of OBSA on bank risk and revenue growth using a sample of Jordanian commercial banks. The results revealed that OBSA has a significant impact on liquidity risk, capital adequacy risk, and market risk. The relationship between OBSA and capital adequacy ratio was negative whereas the relationships between market risk, liquidity risk, and credit risk were positive. However, the relationship between OBSA and credit risk and between OBSA and leverage risk were found to be insignificant. Doumpos (2016) argued that the diversification in OBSA is beneficial for less developed countries. Gornicka (2016) argued that OBSA is complementary to banks and more beneficial under increasing regulatory pressure.

Meng, Cavili and Deng (2017) studied the determination of income diversification in China. They used the non-interest rate income to total asset and income diversification index as the proxies for income diversification. In their study, they chose a comprehensive set of variables from the bank-specific, bank-specific regulating and macroeconomic factors which affect the non-interest income of any country. The study was carried out on a sample of 88 commercial banks. The balanced panel of data from the annual reports of these banks and economic surveys were collected for 8 years i.e. 2003-2010. The findings of the study revealed that bank diversification has a positive relation to bank size. However, they found that increased capital requirement limits diversification. The relationships between the volatility in interbank interest rate and income diversification and between inflation and income were found to be positive. This research is one of the pioneering studies that carried out a comprehensive and in-

depth analysis of income diversification by incorporating all micro and macro factors. However, the study failed to investigate the impact or role of OBSA in income diversification.

By employing the GMM estimator, Islam and Nishiyama (2016) studied the impact of bank-specific, industry-specific and macroeconomic-specific factors on OBS to income return to determine profitability. The mean of OBSA to income return rate was 87.87% which indicates that the income of the banks in the region is well diversified. Meanwhile, OBSA was found to have a positive relationship with profitability. The author had employed two separate models with ROA and ROE as the dependent variables and found that OBSA has a positive relationship with ROE for both models. However, OBSA has a negative relationship with ROE in the bank-specific factor model. Frith, Li and Wang (2016) studied the determinants of OBSA profitability for Chinese commercial banks. In their study, they found that income is not the determinant of non-traditional banking activity.

Using the market power theory, Komorowska (2017) argued that overcapitalized banks have a higher level of engagement in OBSA. Similarly, Umar, Sun and Majeed (2017) argued that OBSA is riskier and that Indian banks engage in OBSA to create additional income; however, excessive engagement in OBSA can lead to turmoil. Banerjee et al. (2017) argued that systematic risk has a significant impact on OBSA. Chang and Talley (2017) argued that the increasing interest rate spread risk makes OBSA relevant. They found that cross country systemic and bank-specific risks matter as countries with higher interest rate risk prefer to engage in OBSA.

Bank-specific risks such as credit risk, and market power has a significant impact on bank diversification in non-traditional activities. Laidroo and Mannasoo (2017) argued

that credit risk and OBSA are endogenous and that the credit risk of any bank is determined by the OBSA as well as determine the OBSA. Capraru et al. (2018) argued that the existing competition level of banks in the market i.e. its market power is a key determinant of OBSA. They argued that in a competitive market, GDP and profitability are the key determinants of OBSA. Mckee and Kagan (2018) argued that although the OBS items are riskier, they leverage banking growth with minor changes in the input. According to them, avoidance of increasing regulatory pressure is a key determinant of OBSA.

An and Yu (2018) studied the OBSA in China and argued that any policy changes in traditional banking in the form of bank-specific, regulatory or systematic risks pose a converse impact on OBSA. Basing their study on the multi-theoretical model consisting of the market power theory, the market portfolio theory, and the regulatory and tax hypothesis, they discussed the theoretical development of OBSA with reference to the Chinese banking sector. In continuance of their work, Akande, Kwenda and Ehalaiye (2018) found that in a market with stiffer competition, OBSA usually carry a higher risk than a low saturated market. This provides support to the market power theory which argues that banks should engage in OBSA only when they possess enough market power which could help them sustain a safer position. After reviewing the existing literature critically in a chronological manner, we identified that OBS activities offer both risks (market power theory) and solutions for higher risks (market portfolio theory, regulatory theory) arising from bank-specific risk, regulatory changes and systematic risk. The current study included two more factors namely level of export and volatility in exchange rate, which according to the authors are the key determinants of OBSA. The next section highlights the key factors affecting OBSA in the commercial banks of South Asia.

2.5. OBSA and Risk

Not much attention has been given on the correlation between non-conventional activities and risk (Hirakata et al., 2017) based on the traditional belief that non-conventional fee-based activities can boost the income of commercial banks without much risk exposure (Le, 2017). This is a tricky belief as the risks of non-conventional activities are ignored. Hence, researchers are inquiring whether the belief has any solid empirical support.

Asset diversification is a widely employed technique for mitigating latent risks (Basheer et al., 2019a). Staying true to the proverb “don’t put all your eggs in one basket”, investors should diversify their assets portfolio to boost their risk-adjusted returns (Basheer et al., 2019b). The portfolio theory states that a company can capitalize on diversification if the assets returns have no positive correlations (Ando et al., 2018). Therefore, investment returns from one source can offset the losses derived from other assets. As such, non-conventional income could be a positive replacement for the dwindling returns derived from conventional activities. Dermine (2009) further demonstrated that assets that are lowly correlated to the total portfolio returns substantially affect the portfolio’s economic profit. The author further stated that despite not having high assets returns, the low correlation affects the portfolio return and diversification results.

Industry stakeholders believe in the traditional view on OBSA as it allows financial asset and income source diversifications for commercial banks (Ali et al., 2018). This is beneficial for the banks especially during uncertainties like when interest rates are volatile. Commercial banks can protect their standing and reach balance with non-conventional fee-based activities (Mutuma, & Mungatu, 2018). This means that

increased OBSA earnings can counterbalance dwindling conventional income sources thus enabling the banks to benefit from diversification.

Many empirical studies had investigated the correlation between OBSA and risks (Boyd & Graham, 1986; Wall, 1987; Brewer III, 1989; Kwast, 1989; DeYoung & Roland, 2001; Stiroh, 2002b; Smith et al., 2003; Chiorazzo et al., 2008; Demirgüç-Kunt & Huizinga, 2010; Hidayat et al., 2012; Mutuma, & Mungatu, 2018). The studies mainly inquired about the effect of non-conventional income on earning volatility and the financial reliability of the banks. Past OBSA studies had demonstrated the effect of merging bank and non-bank institutions on the soundness of American bank holding companies (BHCs) (Boyd & Graham, 1986; Wall, 1987; Brewer III, 1989) and how BHCs can reap the benefits of diversification from underwriting and trading activities (Kwast, 1989). The studies had focused on the ongoing debate concerning the regulation that enables the BHCs to control non-bank institutions.

The various opinions about the effect of non-bank activities on the soundness of the BHC as the parent company and the commercial banks as the subsidiaries resulted in the debate about the pros and cons of the subject (Boyd & Graham, 1986). Non-bank activities were also found to cause higher BHC risk exposures; thus, strict regulations are needed to partly minimize the threat. Wall (1987) suggested that non-bank activities pose a moderating effect on BHC and that non-bank subsidiaries pose more risk reduction effects than risk increasing ones. Kwast (1989) also indicated some degree of diversification benefits from underwriting and trading activities.

Wall (1987) and Brewer III (1989) both found that non-bank activities and risk exposure are inversely correlated but did not find empirical evidence about the effect

of non-bank activities on the soundness of bank earnings. Hence, the earlier studies on this matter failed to reach a consensus for this debate.

With growing financial market competition, studies on the evolution of commercial banks entered a new era. To save themselves from dwindling conventional banking business, commercial banks turned to OBSA. They began to be characterized by significant increases in loan sales share (Mester, 1992) and other OBSA (Edwards & Mishkin, 1995). Empirical investigations began to focus non-conventional activities in highly competitive environments. The unit of analysis also shifted from BHCs to commercial banks which are treated as individual business entities. Large banks are not the sole OBSA participants in highly competitive financial markets. They are also joined by small and medium-sized banks that aim to boost their revenues and capitalize on untapped capacities (Esho et al., 2005; Stiroh, 2004).

Several empirical inquiries had investigated this matter. DeYoung and Roland (2001) used a product-mix approach in explaining the advantages of financial product diversification and stated that OBSA is helpful in boosting bank revenue but to the detriment of causing highly volatile bank earnings. In investigating the correlation between increased dependence on non-conventional income and commercial bank revenue and profits in the context of US firms, Stiroh (2002b) found that proof from accumulated and bank data demonstrated minute advantages of non-conventional activities diversification on the revenue stability.

In the context of European banks and the link between non-interest income and overall income stability, Smith et al. (2003) investigated the effect of non-conventional activities' profitability and risks on interest generating activities and found that OBSA has possible diversification advantages. The key outcomes of their study are: 1) non-

conventional income instability surpasses that of the conventional income, and 2) non-conventional income seems to have a stabilizing effect on the overall operating income, save for two European nations. Lepetit et al. (2008b) indicated that diversification is positively correlated to risks in the context of the commercial banking industry in Europe. This study had categorized non-conventional incomes as fees, commission and trading income. In the context of Italian commercial banks, Chiorazzo et al. (2008) studied the effect of diversification on performance and found that non-conventional income positively affects financial stability.

OBSA diversification in developing countries had been analysed in several studies. Hidayat et al. (2012) investigated the effect of OBSA on the financial stability of Indonesian commercial banks. The study was driven by recent developments that had restructured the Indonesian banking industry post the Asian financial crisis in 1997. It had used the model by Lepetit et al. (2008b) and modified it to study the correlation between non-interest income and risk, but the derived results were contradictory to that of Lepetit et al. (2008b) in which non-conventional income and risk were found to have a positive and significant correlation particularly for large Indonesian banks. Meanwhile, in the context of small-sized banks, the correlation between risk and non-conventional income was discovered to be insignificant.

Nguyen et al. (2012) discovered that bank market power and diversification have a non-linear correlation i.e. banks with less market power have higher engagement in OBSA. Due to the higher ability to gain market shares, commercial banks re-focused on conventional financial services. Lee et al. (2013) indicated that although non-conventional income presents lower risks, it does not lead to better profitability. Kiweu (2012) suggested that OBSA has little benefit on the income stability of Kenyan banks.

Considering that interest income positively correlates to non-conventional income, no diversification benefits are projected as indicated by the portfolio theory.

To date, no consensus has been reached about the true relationship between OBSA and risks. DeYoung and Rice (2004) suggested that the contradictory findings between the US and European banking industries can be justified by the two regions' distinct structural and regulatory frameworks. European banks had started engaging on OBSA much earlier than their US counterparts.

In the US, the universal bank model specifically the combination of commercial bank and investment bank was forbidden before the Gramm-Leach-Bliley Act (GLBA) was enacted in 1999. Asset size was deemed as a significant factor in the decision to engage in OBSA (DeYoung & Rice, 2004b; Chiorazzo et al., 2008). As such, large banks possess more exploitable advantages in gaining the benefits of diversification. In contrast, small banks neither have the expertise nor the capacity to manage OBSA which prevents them from realizing any gains from diversification. Although empirical studies in general agree that OBSA improves the revenue of commercial banks, they are still at odds about the cost of diversification and its overall effect on financial stability. To solidly explain the mixed outcomes, further studies are required (DeYoung & Rice, 2004b).

2.6. OBSA and Macroeconomic Risk

Financial market and economy stability are susceptible to the threat of financial crisis (Giglio et al., 2016). It has affected global regions and caused massive devastating effects. The 2008 sub-prime financial crisis was a solid example of the overwhelming effect of speculation-driven deregulation and risky financial offerings on financial and

economic collapse (Nolan, 2019). The irony of this crisis is that it stemmed from the USA, a great nation long hailed as having solid financial stability.

Following the cataclysmic effect of the sub-prime crisis, the US Federal Government was forced to spend billions of dollars to bail out large financial institutions. As financial markets worldwide are integrated, the measure had inevitably hauled many countries into the most devastating financial recession after the 1933 Great Depression. In the interest of their respective nations, worldwide governments and central banks had established bailout packages to avert massive failures among local financial institutions (Jacoby & Hopkin, 2019).

The subprime crisis had initially only affected the financial sector, but later spread to other sectors given the expansive economic role of the larger financial system. The expected downfall of giant financial institutions led to the collapse of the whole financial system. The domino effect soon impacted the real economy and crumpled private sectors leading to immense numbers of layoffs. Worldwide governments introduced massive funds to help certain non-financial institutions, mitigating starker consequences primarily social ills, global economic depression and political volatility.

Before the global financial crisis occurred, an assembly of bankers, financial market regulators and academics had pushed financial institutions to participate in refined and greatly structured financial products (Reinhart & Rogoff, 2009). They held the belief that derivatives are safe and that promoted securitizations and other financial engineering methods are secure tools to drop risk-laden assets from the balance sheet. Throughout the said period, a number of commercial banks engaged in the process of disintermediation by channeling depositors' money directly to the capital market. The securities and derivatives market experienced exponential revenue increases

(Wilmarth, 2009) and were commended as good replacements for the dwindling conventional banking revenue.

However, some scholars and researchers cautioned against the shortcomings of financial innovations. Edwards and Mishkin (1995) highlighted how commercial banks underwent positive evolution against intensifying financial market competition. They applauded the move by commercial banks to diversify which seemed to help them achieve improved earnings. But they also cautioned against the weakness of derivatives trading.

Rajan (2005) supported the warning and highlighted that the wrong incentive mechanism had caused bankers to ignore the matter of risk exposure in their pursuit of higher investment returns. This activity could endanger the financial stability of the banks on top of the security of the depositors' money. It was driven by OBSA-related incentives. For example, loan sales could remove risky loans and improve capital adequacy ratio and earnings. But the benefits could be negated by the risk of low capital (equity) and possible risk-laden activities (Ismail, 2010).

A number of World Bank researchers carried out a survey on the regulation and supervision of banking systems throughout the global financial crisis (Čihák, Demirgüç-Kunt, Peria & Mohseni-cheraghloou, 2012). They identified several characteristics of the countries that faced the crisis i.e. having loose limitations on non-bank activities, low capital ratio, less motivation for private sectors to monitor bank risks, and lack of regulatory repercussions on bad loans. The survey also took on past studies which indicated the role of weak regulations and supervision in causing financial crisis.

Deregulation has been identified as a determiner of the financial market's speedy progress (Rajan, 2005). Its characteristics include non-conventional activities diversification and substantial non-conventional income increases. DeYoung and Torna (2013) found that non-conventional activities had worsened the failure of US commercial banks throughout the 2007-2008 financial crises. They also discovered that securitization, venture capital and investment banking add to the banks' financial distress during that period. However, the current findings indicate that deregulation merely paves the way for commercial banks to participate in stakeholder activities. In short, banks that tend to engage in risky activities would continue to do so regardless of the state of deregulation.

The downfall of the Lehman Brothers due to the 2008 global financial crisis had an especially contagious effect, leading to massive panics in financial markets including that of South East Asia. Stock prices suddenly dropped leading to the plummeting stock market indices in South Asian countries in the fourth quarter of 2008 (Rillo, 2009). Certain financial indicators suggested that South Asian banks had only experienced moderate effects of the financial crisis (Lim & Lim, 2010). Additionally, the substantial reforms that the banks had undergone following the 1997 Asian financial crisis had helped them weather the 2008 global financial crisis.

2.7. OBSA and Banking Regulations

The Basel Committee on Banking Supervision (BCBS) introduced the capital and reserve requirements in Basel I, Basel II and Basel III to guarantee that financial institutions will have adequate capital as a cushion in the event of unanticipated losses (InvestoPedia, 2015). The Basel Accord states that financial institutions must fulfill the capital and reserve requirements. According to Gauthier, Lehar and Souissi (2012), the macro prudential rule minimizes the likelihood of defaults and systematic risks by 25%. Francis and Osborne (2012) pointed out

that banks have the inclination to adjust their capital ratio to fulfill the demands of the regulator and in accordance to the gap between the actual and target ratio, making it complicated for the relevant risks to be assessed. It has also been demonstrated that when the regulatory requirement is made stricter, efficiency will be negatively affected and cost of risk will increase (Barth et al., 2009). The index of capital adequacy regulation was introduced by Barth James, Caprio Gerard and Ross (2004) for determining the stringency of the capital requirements for each nation as well as the Basel 1 pillar (Bushman & Williams, 2012).

The macro prudential rule aims to curb systematic risks, reduce the economic impact of financial crisis and increase the financial system's immunity (Angelini, Neri & Panetta, 2014). Bukhari and Qudous (2012) indicate that the capital adequacy ratio is positively correlated to profitability along with several macroeconomic factors like GDP growth and money supply. Acharya et al. (2011) and Onali (2014) provided empirical evidence that capital regulation affects dividend policies at times of financial crises, and that there is a positive relationship between dividend and bank risk. Additionally, 116 banks that are close to maintaining the minimum capital requirements demonstrated significantly low dividend ratios.

In terms of OBSA, the banks' systematic risk was observed to increase. Although bank risk is reduced with capital regulation, banks that pursue portfolio diversification have higher risks than those that do not (Neale, Drake & Clark, 2010). There are several findings from past studies on capital regulations and risks. Laeven and Levine (2009) found that the correlation between capital regulation, insurance deposit policies and bank activity restrictions has a significant reliance on the ownership structure. Agoraki, Delis and Pasiouras (2011) stated that bank risk can be monitored effectively using capital regulation and management power in order to determine the equity to capital ratio so that risk can be decreased. The authors also asserted that bank restrictions pose no positive effects on the activities of the banking sector. Meanwhile, Ofoeda, Abor and Adjasi (2012) suggested that restrictions on banking activities due to capital regulations lead to increased risks for the banking sector.

Strict regulations are imposed upon commercial banks worldwide by state central banks. This is in adherence to the Basel agreements which urge the governance and control of banking operations. Sound banking operations determine the progress and development of a nation's economy. Past studies have theoretically and empirically proven that bank engagement in OBS activities can help prevent the incurrence of regulatory costs like minimum reserve and capital adequacy requirements. Basel III is one of the financial restructuring transformations that tackle the impacts of the subprime crisis in South Asian regions (Mirchandani & Rathore, 2013; Ashraf, Arshad & Hu, 2016; Ahmed, Ahmed, Islam & Ullah, 2015). These financial restructuring reforms are driven primarily by capital and reserve reforms like capital adequacy ratio and reserve requirements.

The bank's risk measure increases when the minimum capital requirement rate is higher as it will force the bank to restrict its activities apart from decreasing the bank's charter value (Hellmann, Murdock & Stiglitz, 2000). Gordon and Li (2009) asserted that an unsound banking sector elevates agency cost, where the managers are inclined to act personally in reducing bank risk. According to Jacques and Nigro (1997), based on the Basel accords, capital regulation has a dual effect on risk and 117 risk effects on capital regulation. Supervisory control and capital requirement play a monitoring role on risk due to their ability to increase the equity to capital ratio and lessen risks (Agoraki, Delis & Pasiouras, 2011). Bank engagement in insurance activities has a positive effect on the level of banking activities considering the solid development of the institutions.

In contrast, the findings of most past studies had been inconclusive in determining whether the risk-based capital regulation of banks can indeed avert unnecessary risk taking by the banks (Repullo, 2004). The Basel accords disallow excessive risk taking by banks and instead support the minimization of risk on bank portfolios (Sheldon, 1996). Likewise, capital regulation limitations cause banks to establish sterner criteria for loan disbursement (Bolt & Tieman, 2004). Meanwhile, Hellmann, Murdock and Stiglitz (2000) asserted that added requirements for risk mitigation will degrade the franchise and encourage gambling. According to Abdul

Wahab, Rosly and Masih (2014), Islamic bank managers adhere to conventional practices when it comes to capital adequacy ratio. Karim et al. (2014) highlighted the significant effect of capital adequacy requirements on the growth of deposits and loans in Islamic banks based on data derived from the Organization of Islamic Conference (OIC) over the period of 1990-2009. Pastory and Mutaju (2013) studied 33 banks over the 2003-2011 periods utilizing the linear regression model to determine the effect of capital ratio on non-performing loans and loss provision. The findings demonstrate the greater effect of capital adequacy ratio on asset quality. A higher capital adequacy ratio has a direct effect on asset quality i.e. reducing its productivity. It was frequently found that when the capital ratio increases, the levels of non-performing loans and loan loss provision would increase as well. In the context of Turkey, Büyüksalvarci and Abdioglu (2011) found that capital adequacy positively affects asset quality. Based on the review of past literatures, it can be concluded that very few studies had managed to determine the effect of capital regulation on the OBSA of banks in South Asia.

2.8. Determinants of Commercial Banks OBS Activities: An Empirical Review

Increased attention was given on investigating the determinants of off-balance sheet activities (Pavel & Phillis, 1987; Koppenhaver, 1989; Hassan Lai & Yu, 2001; Nachane & Ghosh, 2007; Khasawneh & Hassan, 2010; Elian, 2012; Raz, Agusman, Gasbarro & Monroe, 2015; Barrell, Karim, Ventouri, 2017; Ye, 2015; Ma'in et al., 2015; Ayadi, Arbak, Naceu & Groen, 2015; Sinha, 2005; Lieu, Yeh & Chiu, 2005; Teixeira, 2013). The operating environment of the banks had witnessed worldwide transformation as the banks are now also involved in risk trading activities (Ma'in et al., 2015). In most literatures, the off-balance sheet activities of banks are usually expressed as a function of bank-specific factors, bank-specific regulatory factors, and macroeconomic determinants (Elian, 2012; Ma'in et al., 2015; Al-Tahat and AbuNqira, 2016).

2.8.1. Bank Specific Factors

The controlling factors of management which influence risk taking and risk diversification decisions are referred to as bank-specific risk factors. Bank-specific factors include capital, size, loans, credit risk, liquidity risk fee-based income, and profitability (Elian, 2012; Ma'in et al., 2015; Al-Tahat and AbuNqira, 2016; Akande et al., 2018; Nisar et al., 2018).

2.8.1.1. Bank Size

Previously, different proxy measures were used for bank size. Bank size can be measured by employees, total sale, and total assets. However, the most predominant and widely used measure is the log of the total asset (Ahmad et al., 2012; Ahmad and Hassan, 2009). Therefore, we used the log of total assets as a proxy for bank size. A number of studies have been conducted to investigate the determinants of non-traditional activities (Rogers & Sinkey, 1999; DeYoung & Rice, 2004; Shahimi et al., 2006). The panel data regression model was employed to analyse the nature of relationships between non-interest income and several explanatory variables. These prior studies agree on the positive linkage between size and non-traditional income. It can be inferred that big-sized banks tend to be more diversified than small banks. In other words, in light of the economies of scope, big banks have taken advantage of their large capacity to improve their revenues from the diversification of OBSA.

Bank size is a potentially important quality indicator in estimating the likelihood of OBS activities. Bank size is measured as a log of total assets. Ahmad (2012), Elian (2012) and Meng, Cavili and Deng (2017) found that bank size is an important determinant of the OBSA of commercial banks. They argued that larger banks are more efficient and better able to engage in OBSA due to the economies of scale and higher exposure to risks. It is also argued that larger banks are equipped with more competent

and qualified personnel, which helps them in winning consumer trust for managing their risk. Considering their superiority and growth, clients feel confident in engaging in OBSA. However, the impact of bank size on OBSA is ambiguous. On one side, it is argued that large banks utilize specialized management skills that allow them to engage in OBSA. Whereas growing banks usually enjoy the economy of scale and stable growth in revenue which encourage risk diversification and offer fewer incentives for engagement in OBSA. According to the economics of scope theory, larger-sized financial institutions have greater potentials in diversifying their asset portfolio (Hassan, 2006).

Avery and Berger (1991) divided the banks into two groups based on their size. One group comprises large banks and the other group small banks. They found that the market is dominated by large banks than small banks. Later on, Rogers and Sinkey (1999) found that bank size is an important determinant and argued that larger banks engage more in OBSA than small banks. In support of their argument, they highlighted the diversification hypothesis as a reason for the negative correlation between bank size and OBSA. Bank size is among the key factors which affect the usage of OBSA. Ahmad (2012) argued that the size of the bank has a significant impact on OBSA. Perera et al. (2014) indicated that bank size has a negative relationship with OBSA in South Asian banks. However, Nisar et al. (2018) argued that size of bank in south Asia is in negative relationship with the bank revenue diversification decisions.

2.8.1.2. Capital

Bank capital to asset ratio is a measure of the banks' ability to absorb losses from both on- and off-balance sheet activities before they become insolvent. A bank with high capitalization may be viewed as possessing more creditworthiness and a better

guarantee of OBS items (Hassan, 2006). Therefore, the impact of capital on OBSA is expected to be positive. Capital is defined as the ratio of modified equity capital to total asset. Meanwhile, modified capital is composed primarily of common stocks, perpetual preferred stocks and retained earnings. Komorowska (2017) based on the market power theory argued that overcapitalized banks have a higher level of engagement in OBSA. Perera et al. (2014) found that in South Asian banks, capital has in significant positive relationship with OBSA.

2.8.1.3. Loan and Advance

Loan ratio is another determinant of OBSA. The relationship between loan ratio and OBSA is expected to be positive. Prior studies by Ahmad et al. (2012), Ahmad (2007) and Ahmad and Hassan (2009) found that loans have a positive relationship with OBSA. To provide support to their findings, they argued that a higher loan ratio increases interest rate risk which in turn makes OBSA more advantageous. The ratio of total loan to total asset is used as a measure of loan ratio. Angbazo (1997) and Ahmad (2007) argued that loan ratio has a positive and significant impact on OBSA. In support of their findings, they argued that an increase in loan ratio would increase credit risk which offers banks more incentives for engaging in OBSA.

2.8.1.4. Profitability

Return on asset (ROA) is used as the measure of profitability. Prior studies had indicated that ROA is positively correlated to OBS activities due to the fact that profitability is also a proxy measure of the soundness of a bank. Ahmad and Hassan (2009) also indicated that most investors and customers regard profitability as a proxy of solvency.

Prior empirical studies by Ahmad and Hassan (2009), Ahmad et al. (2012) and Ahmad (2007) found that the engagement in OBSA by profitable banks surpasses that of their less profitable counterparts. This phenomenon indicates that profitability is a key determinant of OBSA. The finding is in line with that of Joon-Ho Hahm (2008) who specified that more profitable banks demonstrate greater non-interest income ratio. However, Elian (2012) discovered that profitability is negatively correlated to OBSA in the context of GCC nations.

Even though profitability is among the key determinants of bank risk, only a few studies had been carried out to explore the impact of profitability on bank risk. Similarly, zero or limited attention has been given by prior researchers on exploring the impact of profitability on the income diversification of commercial banks in South Asia. Kwan and Eisenbeis (1997) argued that banks with a lower profit margin are more vulnerable than banks with a high-profit margin. These arguments are consistent with the moral hazard hypothesis. Prior studies (e.g. Mamatzakis & Bermpei, 2014; Naceur & Omran, 2011) found that profitability has a significant positive impact on bank risk. Whereas Zhang, Jiang, Qu and Wang (2013) found that profitability has a significant negative relationship with bank risk.

Profitability increases banks' creditworthiness which in turn results in a mixed result. Some banks view increased profit as an opportunity to take risks and engage more in OBSA. Meanwhile, other banks deem increased profit as a means for risk diversification and prefer to avoid risky OBSA. Perera et al. (2014) and Nisar et al., (2018) found that in South Asian banks, profitability has a significant positive relationship with OBSA.

2.8.1.5. Fee Based Income

OBSA are a fee income source for commercial banks which are not within the scope of the bank balance sheet items (Barrell, Karim, Ventouri, 2017). In investigating the determinants of the OBS activities of banks, off-balance sheet activities which are used as the dependent variable in our study is defined as activities which are carried out by banks or any organization to generate additional income in the form of fees, but they do not come under audited accounts such as loan commitments' balance sheet activities which are measured in different ways by different papers (Mckee & Kagan, 2018; Campbell, Feagin, Downes & Utke, 2017). According to An and Yu (2018), a segment of these products with contingent nature and the ability to generate additional income in the form of fees is known as OBSA. Therefore, in the current study, we have taken the view that OBSA can open a window of fee-based income which can increase the performance of the banking sector. Thus, the current status of bank-specific risk is a key determinant of bank, OBSA, that also increases bank risk. Nisar et al. (2018) found that the fee-based income is in significant relationship with the OBSA.

2.8.1.6. Market Power

A higher market power implies a saturated market, which is characterized as a market with several big players enjoying a monopolistic situation (Edwards & Mishkin, 1995). Literature argues that banks with higher market power are less likely to diversify their resources (Elian, 2012) and that banks do not prefer to engage in risky OBSA. However, on the other hand, it was argued that when market power increases, it offers banks enough strength to bear the shock arising from the OBSA and that banks are likely to increase their engagement in OBSA. Authors such as Elian (2012), Santos (2011) and Basheer et al. (2019) found a positive and significant relationship between market power and OBSA. Similarly, Roland and Maxwell (2006) argued that banks with low

market power due to diminishing benefits from traditional activities are more likely to increase their engagement in OBSA. The argument was also supported by Moshirain et al. (2011) who found a negative relationship between market power and OBSA. In the case of South Asia, Perera et al. (2014) found that the market power of banks in four selected South Asian countries has a negative and significant relationship with OBSA. This view supports the market portfolio theory. As the competition in financial markets intensifies, studies on the evolution of commercial banks enter a new era. Commercial banks have moved towards non-traditional activities to counter the decline in traditional banking business. Substantial increase in the share of loan sales (Mester, 1992) and other off-balance sheet activities (Edwards & Mishkin, 1995) portray the new “look” of commercial banks.

2.8.1.7. Credit Risk

Credit risk is one of the types of bank risks; credit risk is estimated by the ratio of provision for loan losses to total loans or net charge-off ratio. The net charge-off ratio (NCHR) is another determinant of OBSA. The charge-off is the difference between the written-off loans and the recoveries of uncollected loans. The relationship between NCHR and OBSA is expected to be positive (Elian, 2011). The market discipline hypothesis suggests that a higher credit risk causes banks to have lower engagement in OBSA. Based on the studies by Ahmad et al. (2012), Elian (2011), Ahmad (2007) and Ahmad and Hassan (2009), a negative correlation between credit risk and OBS activities is thus theorized. Nevertheless, the correlation can be explained by two perspectives. The first one suggests that banks with lower credit risk are likely to engage in more OBS activities that forming a significant negative correlation which is in line with the market power theory. The second opinion states that banks with greater credit risk tend to engage in more OBS activities thus creating a significant positive

correlation. In short, credit risk has varied influence on OBSA engagement. A majority of the prior studies however ratify the negative correlation (Ahmed et al., 2012). Thus, credit risk is anticipated to affect OBSA engagement negatively consistent with the market discipline theory. Perera et al. (2014) Nisar et al., (2018) also supported this view based on their finding that credit risk is significantly and negatively correlated to OBSA in the context of South Asian banks.

2.8.1.8. Liquidity Risk

Without a proper context, the definition of liquidity is often vague and thus its usage would be ineffective (France, 2008). Despite being difficult to define, it is also a concept that cannot be disregarded . Liquidity entails the economic agent's ability in converting an existing capital into assets, goods or services. In this context, liquidity refers to a flow concept instead of a stock (Vo & Phan, 2019). An asset is therefore 'liquid' if it is easily convertible into cash or other equivalent forms (Culham, 2020).

Bankscope delineates liquid assets as loans that are less than three months away from maturing in addition to quoted or listed government bonds and cash (Alman & Oehler, 2010). Liquidity forms the essence of an organization both banking and non-banking whereby liquid assets serve an essential management function. In the field of economics, liquidity is measured by how easy and fast it is to convert an asset (Sanghani, 2014). Riding on that definition, a car would be less liquid than gold, whereas treasury bills have higher liquidity than corporate bonds. Hence, out of all forms of capital, cash has the highest liquidity . In banking, to achieve profit a tradeoff with liquidity is necessary. While banks operate in cash or liquidity, they also ride on the principle of fractional reserve which necessitates a balanced ratio of liquidity and profit.

There are four sources of liquidity according to Nikolaou (2009) namely: 1) short-term (liquid) deposit i.e. the main source of funding liquidity consisting of the bank depositors' money, 2) market liquidity i.e. when banks sell their assets via loan syndication, securitization and loans from secondary markets to generate liquidity, 3) interbank market i.e. where banks source for liquidity from other banks, and 4) central bank i.e. the last resort lender which act as a direct but temporal buffer to liquidity shocks thus allowing time to supervise and regulate LRs. Additionally, Nikolaou (2009) also listed monetary or macroeconomic liquidity i.e. the growth of money, credit and aggregate savings which thus fall under central bank liquidity.

There is also funding liquidity i.e. the capability of banks to fulfill their liabilities that are due (BIS, 2008). These sources of liquidity are linked. During normal course of business, Central Banks offer a certain liquidity amount for stabilizing demand and supply via the Statutory Reserve Requirement (SRR). Meanwhile, the management of market liquidity is done via interbank money market and short term asset markets re-distributes while maintaining the liquidity and funding position. The sharing of liquidity resources is carried out effectively by liquidity management.

Nevertheless, under flawed markets and with lopsided information, Central Banks are unable to distinguish between a bank that is illiquid and in debt. Failure in coordinating depositors, banks, or traders under such conditions will lead to the emergence of LRs (Nikolaou, 2009).

Liquidity and solvency are closely interrelated (Goodhart, 2008). These two terms refer to the financial wellbeing of an organization. However, there is difference. Solvency denotes the extent to which long-term obligations of an organization can be met. Liquidity on the other hand refers to the capability to settle short-term obligations. A

solvent firm owns more than it owes. An illiquid bank can rapidly become insolvent, and an insolvent bank become illiquid. Hugonnier and Morellec (2017) defines solvency in terms of market value of assets relative to the debt of an organization while liquidity is cash reserves relative to current liabilities.

Banks fail because of insolvency. A combined shortage of liquidity can also render a bank insolvent. Banks' failure also cause liquidity and can lead to shrinkage in the collective pool of liquidity (Diamond et al., 2017). Liquidity and solvency problems interact and one can cause the other. The issue here is; illiquid assets are usually financed by banks with demandable claims. A company is solvent if its assets are more than its debt. This means that its net worth is positive and able to manage its debt portfolio (Pappas, et al. 2013). It also means that when a company is solvent, it has more assets than liabilities. The company can settle its debt without losing its net worth. Solvency risk occurs when a bank is not able to meet up maturing obligations due to its being in a negative net worth (Almarzoqi, Naceur & Scopelliti, 2015). This means the bank has more liabilities than assets. This usually happens when a bank suffers losses on assets due to write-offs on securities and unsettled loans but the capital base is not sufficient to cover the losses. Two factors that influence solvency position are adequate capital and profitability. LR on the other hand happens when a bank is not capable of meeting short-term obligations. This occurs when the bank does not have enough funding (funding liquidity) or if its investments and assets cannot be sold quickly for cash without incurring unnecessary losses (market liquidity) (Almarzoqi, et al. 2015). Hence, investors make investment decisions using liquidity ratios and solvency ratios. The former determines the institution's ability to convert assets into cash, while the latter measures the institution's capacity in fulfilling its financial obligations. Long-

and short-term financial obligations fall under solvency ratios whilst short-term debt obligations and current assets fall under liquidity ratios.

Liquidity risk is one of the important factors which affect bank performance, profitability and non-traditional banking activities such as OBSA. Liquidity risk is defined as the inability to satisfy claims due to a mismatch in bank assets and liabilities. It is proposed that a bank with higher liquidity risk prefers to go for OBSA. Ahmad and Nisman (2012) found that OBSA has a positive relationship with liquidity risk. Swain and Panda (2017) also found that liquidity risk has a significant impact on the liquidity risk of banks. Perera et al. (2014), and Nisar et al. (2018) found that in South Asian banks, liquidity risk has a significant positive relationship with OBSA. This indicates that the mismatch between assets and liabilities can also be a reason for engagement in OBSA. Liquidity risk can be caused by the maturity mismatch between assets and liabilities. Liquidity risk is among the crucial risks which not only affect the expected returns, but also operational performance. An appalling financial condition can decrease the value of the banks and cause them to engage in OBSA. Whereas in the current case where provision and advances against non-performing loans are decreasing and consequently removing liquidity constraints, the disengagement of South Asian commercial banks from OBSA can be justified using the arguments broached by the modern portfolio theory, the moral hazard theory, and the market discipline hypothesis.

2.8.2. Bank Specific Regulatory Factors

Commercial banks around the world are under strict regulation by the state central banks which receive guidelines from Basel agreements to govern and control the operations of the banking sector. The healthy operations of the banking industry are at the heart of a progressive and developing economy. Theoretical and empirical

literatures show that banks engage in OBS activities to avoid certain regulatory costs such as minimum reserve and capital adequacy requirements. The Basel III implementation is considered as one of the financial restructuring reforms that address the aftermath of the subprime crisis in South Asian countries (Mirchandani & Rathore, 2013; Ashraf, Arshad & Hu, 2016; Ahmed, Ahmed, Islam & Ullah, 2015). The capital and reserve reforms such as capital adequacy ratio and reserve requirements are at the heart of such financial restructuring reforms. The following regulatory variables are reviewed from several empirical studies on different banking areas.

2.8.2.1. Reserve Requirement

The measurement for reserve requirement entails the required reserves ratio. Prior literatures suggest that reserve requirement will positively affect OBSA. The regulatory tax hypothesis argues that reserve requirements are the key drivers of bank OBSA and that reserve requirements increase regulatory pressure and act as a bottleneck. To compensate for the loss of income and the increase in operating expenses arising from reserve requirements, commercial banks engage in OBSA. Hassan (2006) found a positive relationship between reserve requirement and OBSA.

2.8.2.2. Capital Requirement

The capital adequacy ratio (CAR) is used as a proxy for capital requirements. The CAR measures the bank's ability to hold additional capitals for the sake of protecting the depositors' deposit and ensuring the stability and efficiency of the bank's operation (Ahmad & Hassan, 2009). A group of researchers (Sinha, 2005; Elian, 2012; Chen, 2015; Tahat & AbuNqira, 2016) examined and claimed capital requirements as one of the most important determinants of OBSA. The regulatory tax hypothesis and reserve requirements imposed an additional cost which ultimately reduces banking profit. To

avoid the costs and risks arising from tax regulation and capital and reserve requirements, banks prefer to engage in OBSA. The cost of meeting capital reserve requirements and holding non-interest-bearing reserves raise the cost of funds for a bank above what non-bank institutions must pay. Hassan (1991) argued that the amount of OBS items is in direct relation to the regulatory and tax cost. He further argued that increasing regulatory and tax pressure offers additional incentives for banks to engage in OBSA. Mahoney, Crook, Tully, Strafaci (2017) claimed that OBSA such as financial derivatives which are not regulated prompt the moral hazard behavior.

Capital adequacy ratio (CAR) is the ratio that regulators and financial market watch groups use to determine the health of banks and their capability in absorbing losses arising from non-performing loans. From the above discussion and prior empirical findings, it is clear that CAR has a significant impact on banks' OBSA. However, the nature of the relationship between OBSA and CAR is still vague. It has been generally argued that high regulatory pressure drives a bank to engage in OBSA.

2.8.3. Macroeconomic Factors

The engagement of banks in OBSA is not only determined by bank-specific factors, but also macroeconomic factors such as inflation, economic growth, and interest at spread (Nisar et al., 2018).

2.8.3.1. Economic Growth

Various factors affect the economic growth of a country, and one of it is the financial systems. The performance and institutional framework of any financial system have a significant impact on the economic growth of a country. Economic growth is basically the growing production capacity of a country that relies more on domestic goods which in turn leads to a positive balance of payment in a particular period. Traditionally, the

aggregate of economic growth is measured by gross national product (GNP) or gross domestic product (GDP), although alternative metrics are sometimes used too. There is a link between financial sector and economic growth. The recent episode of economic turmoil caused by the financial crisis revealed that economic growth and banking performance are interdependent. Similarly, prior studies by Ma'ina et al. (2015), Karim et al. (2013), Ahmad et al. (2012), Elian (2012), Ahmad (2007), Ahmad and Hassan (2009) and Nachane, Ray and Ghosh (2007) argued that economic growth is among the most important determinants of OBSA. In terms of the relationship between OBSA and economic growth, the studies mentioned above offer two conflicting arguments. The first argument advocates a positive relationship between economic growth and OBSA and justifies that economic cycle increases business transaction which ultimately increases the demand for OBSA. The second argument suggests that economic growth has a negative relationship with OBSA and that it helps banks to earn expected profits which cause them to avoid OBSA (Nisar et al., 2018).

2.8.3.2. Interest Rate Spread

OBSA is also significantly determined by interest rate spread. A positive correlation between interest rate spread (as determined by the net interest margin) and the OBSA of banks has been suggested. The positive relation indicates the uncertainty about whether or not the future interest rate will place additional risks on the banks' expected returns. Therefore, to mitigate such risks, banks engage in OBSA which they consider as a risk management tool (Ahmad, 2007). However, the relationship between interest rate spread and OBSA is ambiguous and could be negative as well. This is especially true when the spread is increasing such as in conditions where the banks lend at a higher rate but borrow at a lower rate. This situation helps the banks in attaining the targeted or expected returns (Ahmad, 2007). Ahmad (2007) carried out a study on an

international sample and found that interest rate margin and OBSA have a negative relationship with each other. The author also indicated the positive effect of net interest margin on OBSA in the context of African, North American and G7 banks. However, Ahmad and Hassan (2009) indicated the statistically insignificant effect of interest rate spread on OBSA in the context of MENA commercial banks. This implies that banks do not consider the uncertain future interest rates when deciding on OBS contracts. The thesis indicates an expected negative interest rate based on the World Bank information that South Asian banks have low interest rate spread which may drive them to take up the additional income source.

2.8.3.3. Inflation

Banks' OBSA may also be negatively affected by inflation, a macroeconomic condition that is commonly disregarded in previous studies on OBSA (Nisar et al., 2018). Using the consumer price index (CPI) as proxy for inflation, Ahmad (2007) found that the purchasing power of consumers would decrease with high inflation. Ahmad (2007) suggests that increased inflation decreases the purchasing power of individuals and reduces savings. The reduction in savings in turn reduces the deposits which ultimately affects banking income and all banking activities (on- and off-balance sheet activities). This variable (INF) is measured by the growth rate of the inflation rate.

Consequently, the aggregated demand decreases and places a significant impact on international trade which in turn negatively affects the OBS. This is consistent with the argument by Joon-Ho Hahn (2008) that the low-inflation environment boosts economic activities which in turn provides commercial banks with more OBS opportunities. The author indicated that low inflation redirects the corporate financing and saving behavior of firms and households to capital markets which offer various

capital-related business opportunities including fund sales income, asset-backed securitization as well as securities and derivatives trading. Karim et al. (2013) also found inflation to be one of the most important determinants of OBS usage in commercial banks. Meng, Cavili and Deng (2017) also argued that during high inflation periods, banks diversify their income by engaging in OBSA.

2.8.3.4. Level of Export

Export plays a significant role in the development and progress of the economic institute of any country (Papanek, 2019). OBS items such as loan guarantees, loan commitment, and financial guarantees are the product of export activity (Cowling et al., 2019). Although existing literature provides no evidence of the relationship between the level of export and OBSA, based on the importance of non-traditional banking activities in trade activities, it can be argued that the decreasing levels of export and subsequently increasing budget deficit can be a reason for the decrease of OBSA in South Asia.

The impact of export level on the OBSA of commercial banks is still an unexplored issue. To the best of the author's knowledge, there is zero or limited research on this issue. Although many researchers with different theoretical models have tried to explain the link between export level and bank performance, limited attention has been given in exploring the link between bank income diversification and exchange rate.

2.8.3.5. Exchange Rate

The exchange rate is basically a rate at which any country trades with other countries in the foreign exchange market (Hussain et al., 2017). The foreign exchange market normally uses US dollar as a standard measure to determine any country's exchange rate. Bradley and Moles (2002) defined exchange rate as the price of a unit of foreign

currency against domestic currency. According to Reid and Joshua (2004), exchange rate is the value of one unit of foreign currency against the local currency. It is also argued that exchange rates like any other commodity are explained by the law of demand and supply. Supply of currency is explained by changes in fiscal policies whereas currency demand is influenced by a wide range of factors such as inflation rates and interest rates.

The foreign exchange market normally comprises large banks (particularly their treasury departments) and foreign exchange companies. The demand and supply of any currency is the biggest determinant of its exchange rate. However, in reality, there are certain factors such as monetary policy, foreign reserves, political stability, trade deficit and so on that affect the exchange rate of any currency.

The variation in foreign exchange rates could be a determining factor of bank profitability due to the fact that it influences the banks' intermediation process. Foreign exchange rates are convenient as all countries transact business on a mutual basis. In determining the trade balance of a country, the variation in exchange rate is highly significant (Adetayo, Dionco & Oladejo, 2004). According to Berger and Bouwman (2010), similar to other commodities, exchange rates operate based on demand and supply. Currency supply is determined by fiscal policy changes whilst currency demand is determined by inflation and interest rates among a myriad of other factors (Brunnermeier & Lasse, 2009).

Variations in exchange rate affect the import prices of consumption and intermediate products. Commercial banks play the role of mediator in the supply and demand of foreign currency. The banks' financial performance would be affected if limitations are imposed on how they conduct their business. Exchange rate variations pose a significant

effect on import prices and locally-made products. In examining foreign exchange exposure and bank size in the context of China, Wong and Leung (2008) found a positive correlation between both. An increase in foreign exchange is found to minimize equity values and hence hinder the performance of the banks.

The impact of exchange rate on the OBSA of commercial banks is still an unexplored issue. To the best of the author's knowledge, zero or limited research has been carried out on this issue. Although many researchers with different theoretical models have tried to explain the link between exchange rate and bank performance, limited attention has been given on exploring the link between bank income diversification and exchange rate.

2.9. Summary and Gap in the Existing Literature

This chapter had reviewed literatures on OBSA and shed light on the impacts of bank-specific risks, regulatory pressure and macroeconomic factors on OBSA. The chapter also discussed the theoretical lenses used in prior studies to explain the determinants of OBSA such as the market portfolio theory, market power theory, the economy of scope theory, the market discipline theory, and the regulatory and tax hypothesis. The market portfolio theory views OBSA as a tool for risk diversification whereas the market power theory deems OBSA as a risky activity and advises banks to engage in these activities only when they have successfully managed the existing risks. The economies of scope theory argue that OBSA has certain costs and benefits, and banks should engage in these activities to ensure the economy of scope. Finally, the regulatory and tax theory argues that OBSA provides a buffer against mounting regularity pressures and banks should engage in these activities to avoid regulatory costs.

Several empirical studies had been carried out to determine the effect of OBSA on the financial performance of commercial banks specifically profitability and risks. Earlier studies on OBSA had examined the benefits of diversification in terms of the engagement of bank holding companies (BHC) in non-bank financial activities (Boyd & Graham, 1986; Wall, 1987; Brewer III, 1989; Kwast, 1989) as well as the possible unions between BHCs and other non-bank financial institutions (Boyd & Graham, 1988; Boyd, Graham & Hewitt, 1993). The studies investigated the effect of the deregulation of the American banking system which enabled the BHC to control non-bank financial institutions (Boyd & Graham, 1986). It can also be deemed as a reaction to the new GSA analysis (Kwast, 1989).

Latest empirical studies on OBSA have employed more refined frameworks and innovative statistical methods. Their focus was not only on the US (Rogers & Sinkey, 1999; DeYoung & Roland, 2001; Stiroh, 2002a; Stiroh, 2002b; DeYoung & Rice, 2004b; Stiroh & Rumble, 2006; DeYoung & Torna, 2013), but also other regions including Europe (Smith, Staikouras & Wood, 2003; Rime & Stiroh, 2003; Baele et al., 2007; Mercieca, Schaeck & Wolfe, 2007; Chiorazzo et al., 2008; Lepetit, Nys, Rous & Tarazi, 2008; Elsas, Hackethal & Holzhäuser, 2010), Asia (Hidayat et al., 2012; Mirzaei, 2010; Nguyen et al., 2012; Shahimi et al., 2006; Sufian & Ibrahim, 2005), Africa (Kiweu, 2012) and Australia (Esho, Kofman & Sharpe, 2005; Williams & Gulasekaran, 2009; Williams & Prather, 2010). Several empirical studies had also employed global data (Laeven & Levine, 2007; Lozano-Vivas & Pasiouras, 2010; Demirgüç-Kunt & Huizinga, 2010; Engle, Moshirian, Sahgal & Zhang, 2011). Many had saturated on commercial banks' non-conventional activities except for a few that had focused on smaller banks (Stiroh, 2002a; Esho et al., 2005; Mercieca et al., 2007) and Islamic banks (Mirzaei, 2010; Shahimi et al., 2006). The studies mainly posed the

research question of: Does the diversification to OBSA decrease the risks of commercial banks? (Boyd & Graham, 1986; Wall, 1987; Kwast, 1989; DeYoung & Roland, 2001b; Stiroh, 2002b; Smith et al., 2003; Chiorazzo et al., 2008; Demirgüç-Kunt & Huizinga, 2010; Hidayat et al., 2012).

Other inquiries focused on the effect of OBSA on interest margins (Lepetit et al., 2008b), efficiency of banks (Vennet, 2002; Tortosa-Ausina, 2003) and their stock values (Laeven & Levine, 2007; Baele et al., 2007). Pavel and Phillis (1987) investigated the factors for loans sale in commercial banks using a broad set of variables; they found that diversification, reserve requirements and loan growth significantly affect the banks' loan sale activities. They suggested that the banks conduct loan sales when capital ratios are low and charge-off ratios are high. Yet, they failed to suggest correlations to loan sales by employing economic variables like economic growth, inflation and interest rate spread. The findings clearly indicate that the OBSAs and their bank practices depend on various factors in relation to the region and its distinct features, and that there is a severe lack of studies on banks in South Asia.

Hence, this present study intends to fill that gap. South Asian commercial banks compete using non-interest income sources given the competition and reductions in interest income. In devising policies about the usage of off-balance sheet items, the factors that motivate South Asian commercial banks to engage in OBSA must first be determined. Hence, it is a crucial present-day problem that must be understood by financial and regulatory institutions and markets. This study puts forth the argument that systemic and bank-related risks as well as regulatory pressure critically determine banks' decision to engage in OBSA.

CHAPTER THREE

RESEARCH METHODOLOGY

The preceding chapter presented the review of the existing evidence on off-balance sheet activities and factors affecting their usage. We have tried to make an in-depth and critical review of existing literature and presented the available literature in chronological order. The literature review has helped the authors of the current study in developing a comprehensible understanding of the deterrents of OBSA. Meanwhile, we have given an in-depth insight on the different methodologies and research techniques used in the prior studies of the current area. Therefore, this chapter provides the detail steps and procedures used to achieve the research objectives of the current study. The chapter includes the research approach; research hypothesis and methods adopted including the data collection tools and methods of data analysis.

3.1. Conceptual Framework

The OBS development theory was initially proposed in the United States of America during late 1980. The regulation avoidance theory was the first theory coined in the banking literature that explain the regulatory cost as one of the reasons why banks engage in the OBSA” (Pavel & Phillis, 1987; An & Yu, 2018). The bypass of reserve requirements and the capital adequacy requirements were considered as key reason behind the bank’s engagement in the OBS. However, empirical researchers on the US have rejected the theoretical justification (Benveniste & Berger, 1987; Koppenhaver, 1989; An & Yu, 2018).

After almost a decade scholars have started to propose the OBS theories with the active perspective. Boot and Thakor (1991), was the first who proposed the “risk diversification theory”. Basing their research on the market portfolio theory they have argued that the OBS engagement helps the bank in reducing the overall. The second one is “market power theory” (Jagtiani, & Khanthavit, 1996), it argues that banks with a better performance and creditworthiness can develop more OBS activities. Later Nachane and Ghosh (2002, 2007), Khasawneh and Hassan (2010), and Elian (2012) argued that macroeconomy has significant impact on the OBS development. Recently Nisar et al., (2018) argued that the revenue diversification is relevant to stability and profitability of banking industry of South Asia.

This thesis examines the effects of bank-specific factors (such as capital, bank size, loan and advances profitability, market power, credit risk, and liquidity risk), bank-specific regulatory factors (such as reserve requirement and capital adequacy ratio), and macroeconomic factors (such as economic growth, interest rate spread, inflation, Volatility in Exchange rate and export) on off-balance sheet activities in conventional commercial banks of South Asia. The theoretical model of the study is developed on the basis of literature reviewed in the previous chapter and based on the modern portfolio theory, market power theory, moral hazard theory, and regulatory and tax theory.

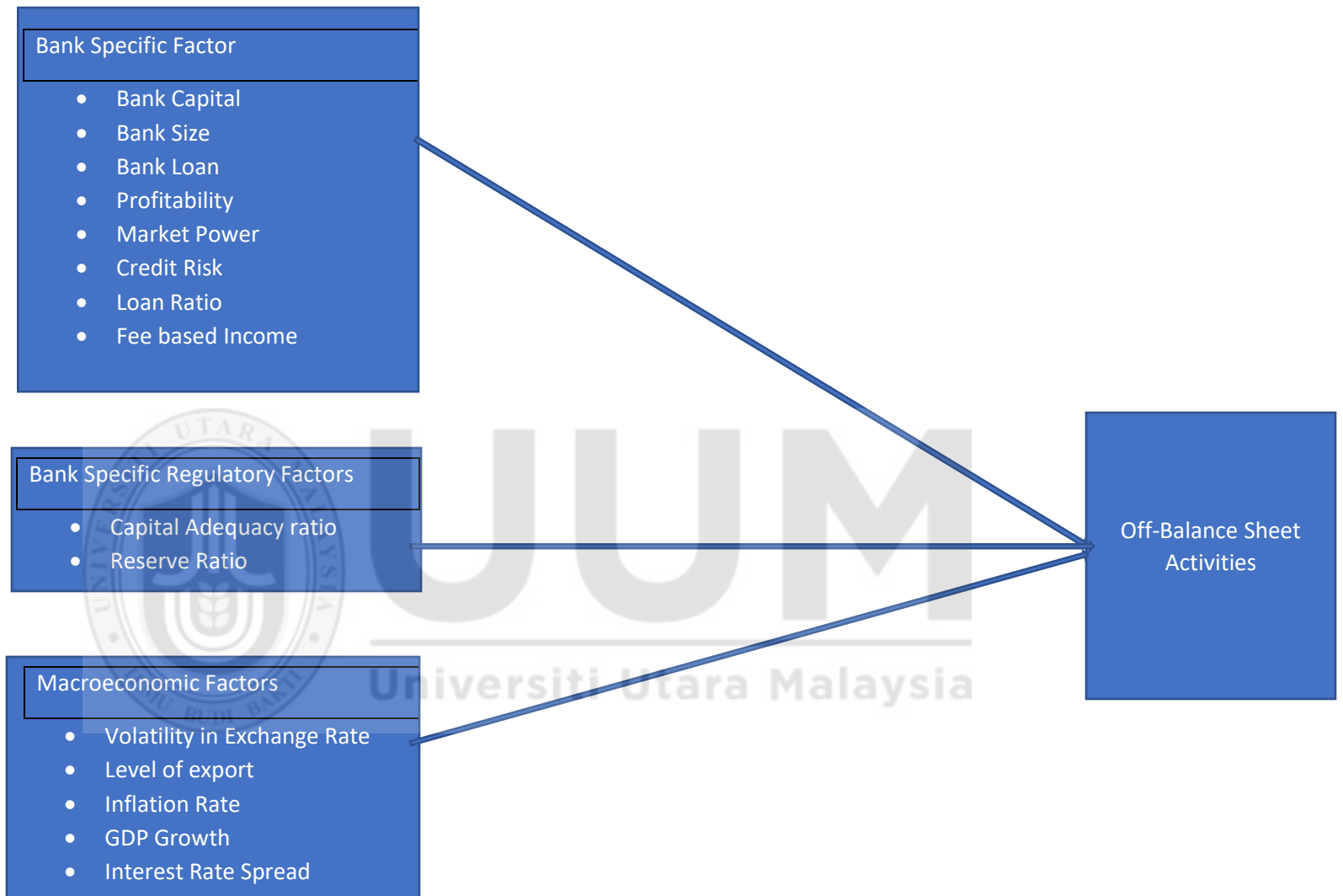


Figure 3.1: Bank Regulatory Changes, Bank Specific Factors, Systematic risk, and the Off-Balance-Sheet.

3.2. Model Specification

OBSA are of unique nature, systematic risk, bank specific risk, and regulatory pressure play a key role in determining the engagement of banks in these activities. Thus, in line with the reviewed literature, the study has used the market portfolio theory, market discipline theory, and regulatory and tax theory to estimate the models of the current study.

3.2.1. Modern Portfolio theory

Implying modern portfolio theory, one can argue that engagement with OBSA helps the banks in the diversification of their portfolio risk. Hassan (1993) and Sun, Wu, Zhu, Stephenson (2017) argued that the OBSA helps the bank in creating an optimum portfolio which not only reduces the bank risk but also enhances the expected return. They further argue that banks need and desire to diversify their loan and investment portfolio risk provide incentives in undertaking OBSA. Sun et al. (2017) argued that the portfolio theory is a strong justification by the banking sector for the aggressive undertaking of OBSA. They further argued that the increasing reliance on OBSA is because of risk associated with high volatility in income which is consistent with the portfolio theory. Recently Ekanayake and Wanamalie (2017) argued that OBSA is individual which are not correlated and can be used to reduce bank risk. This argument is consistent with portfolio theory of Markowitz (1952). Markowitz (1952) argued that the individual assets which are not fully correlated help the firm to reduce the portfolio risk. So, in a nutshell, we can say that market portfolio theory sees OBSA as a tool of

banking risk management (Ye, 2015). The modern portfolio theory views the diversification as function of bank risk (An & Yu, 2018: Boot & Thakor 1991: Nisar et al., 2018). Therefore, mathematically it can be explained as follow

$$Diversification_t = f(Risk_t) \dots \dots \dots (3.1)$$

The modern portfolio theory argues that banks diversify their income source to mitigate risk therefore according to portfolio theory the main purpose of performing OBSA is to manage banking risk (An & Yu, 2018:Ye, 2015, Khasawneh et al., 2012: Nisar et al., 2018). Therefore mathematically equation 3.1 can be expressed as

$$OBSA_t = a_0 + \sum_{n=1}^k (a_n Risk_t) \dots \dots \dots (3.2)$$

The bank capital is a significant determinate of OBSA. According to Hassan (2004) increase in capital is in positive relationship with risk with risk taking ability. Whereas the market portfolio view if the firm's ability of taking risk is increasing than their level of engagement in OBSA will decrease, thus equation 3.2 can be expressed as follow;

$$OBSA_t = a_0 - a_1 CAPITAL_t \dots \dots \dots (3.3)$$

The larger banks are assumed as safer banks with low risk and enjoying sustainable growth (Elian, 2012). It is argued that when bank size increases the bank risk decreases and offer fewer incentives to banks for engaging in OBSA (Khasawneh et al., 2012; Elian, 2012). Therefore, the proposition of modern market portfolio theory regarding the relationship between bank size and OBSA is negative. Therefore, the equation (3.3) will be changed as follow

$$OBSA_t = a_0 - a_1CAPITAL_t - a_2SIZE_t \dots \dots \dots (3.4)$$

Net profit of banks is a critical determinant of diversification (Khasawneh et al., 2012; Elian 2012: Ma'in et al., 2015). The decrease in net income of any bank decreases the creditworthiness which in turn offers an incentive for diversification and encourages banks to engage in OBSA to increase their net income (McKee & Kagan, 2018).

$$OBSA_t = a_0 - a_1CAPITAL_t - a_2SIZE_t - a_3PROFITIBILITY_t \dots \dots \dots (3.5)$$

Modern portfolio theory views that when bank loan increases it increases the bank credit and total risk (Calmes & Theoret, 2010: Khasawneh et al., 2012; Elian, 2012). The increased credit and bank risk make diversification more beneficial and offer more incentives for engagement in OBSA.

$$OBSA_t = a_0 - a_1CAPITAL_t - a_2SIZE_t - a_3PROFITIBILITY_t + a_4LOAN_t \dots (3.6)$$

Market portfolio theory argues that banks engage in OBSA to mitigate or avoid credit and liquidity risk. Similarly, the liquidity risk of banks increases the total bank risk and offer more incentive for diversification liquidity.

$$OBSA_t = a_0 - a_1CAPITAL_t - a_2SIZE_t - a_3PROFITIBILITY_t + a_4LOAN_t + a_5LR_t + a_6CR_t \dots \dots (3.7)$$

Market concentration reduces competition and bank risk (Phan & Daly, 2016). Theoretically, higher market concentration implies more market power and less competition and hence is likely to be associated with less diversification of bank

products toward OBS activities (Khasawneh et al., 2012; Elian, 2012; Ma'in et al., 2015; Choi Fedenia, Skiba & Sokolyk, 2017).

$$OBSA_t = a_0 - a_1CAPITAL_t - a_2SIZE_t - a_3PROFITIBILITY_t + a_4LOAN_t + a_5LR_t + a_6CR_t - a_7MP_t \dots\dots\dots (3.8)$$

Fee based income is one of the parameters of this success of the OBSA as it gives the true measure of risk associated with the OBSA as well as also show their efficiency in mitigating the risk arising from the traditional banking activities (An & Yu, 2018; Liu, Wu, & Lou, 2018). In this study we are arguing that the fee-based income of last year FEE_{t-1} is determinant of $OBSA_t$ activities of current year. The market portfolio theory view considers the fee-based income as tool of risk mitigation therefore we can predict a positive relationship with fee-based income and OBSA activities.

$$OBSA_t = a_0 - a_1CAPITAL_t - a_2SIZE_t - a_3PROFITIBILITY_t + a_4LOAN_t + a_5LR_t + a_6CR_t - a_7MP_t + a_8FEE_t \dots\dots\dots (3.9)$$

The market portfolio theory considers the OBSA as positive persistent, meaning that the with the increase for bank specific risk, OBSA will decrease and the decrease will be persistent over time. Following Drobetz et al., (2014) persistency of OBSA is captured using one period lag of OBSA. Hence equation 3.9 will become

$$OBSA_t = a_0 - a_1CAPITAL_t - a_2SIZE_t - a_3PROFITIBILITY_t + a_4LOAN_t + a_5LR_t + a_6CR_t - a_7MP_t + a_8FEE_t + a_9OBSA_{t-1} \dots\dots\dots (3.10)$$

The equation 3.10 represents the mathematical form, of market portfolio theory for our conceptual framework. The expected signs according to the portfolio theory are summarized in table 3.1.

Table 3.1
Summary of expected signs (Market portfolio theory)

Variable	Expected Sign
LagOBSA	Positive (+)
Capital	Negative (-)
SIZE	Negative (-)
Profitability	Negative (-)
Loan	Positive (+)
LR	Positive (+)
CR	Positive (+)
MP	Negative (-)
FEE	Positive (+)

3.2.2. Market Power Theory

Market power theory views the market power and creditworthiness as key determinates of diversification descensions of banks. According to market power theory, the OBSA are uninsured, and contingent (risk behavior is related to other claims on the bank) activities and the banks in safer position will engage in any such risky activity (Khasawneh & Hassan, 2010; Elian, 2012; Al-Tahat and AbuNqira, 2016). Whereas in the previous section the modern portfolio theory considers OBSA a risk management tool and justify their overweighed figures as a tradeoff between the risk of losses arising from interest-based or conventional banking activities. The economies of scale and

economies of scope are used as emanator of bank diversification decisions in market power theory. The basic mathematical expression of this theory can be as

$$Diversification_t = f((Market\ Power, Performance)_t)..... (3.11)$$

Market power theory claims the risk status of an institution as a major determinant of OBSA (Khasawneh & Hassan, 2010; Elian, 2012; Al-Tahat and AbuNqira, 2016). This indicates that the banks are enjoying growth and safe, issue greater volume of OBS items than the riskier banks (Elian, 2012). This hypothesis claims that the OBS items are not insured, and the claims on these activities are contingent on other claims on the bank. The value of these claims to a customer increases with the safety of the bank, providing incentives for banks that issue OBS items to increase their safety and encouraging less risky banks to issue additional OBS items (Hassan, 2006). Many prior studies such as Ahmad et al. (2012); Ahmad and Hassan (2009) and Ahmad (2007) provided the support to market power hypothesis and found that profitable banks engage more on OBSA than poor performing banks. OBSA are the activities which are being used as a risk mitigation tool by banks, but at the same time, these activities of contingent nature can transform themselves into a source of additional risk (Elian, 2012). Therefore, we can say that OBSA is very risky and their associated risk can transform them into an opportunity or a threat. For example, guarantees which are a source of an additional income also add the risk of future payments even in acute stress situation or unfavorable circumstances (Hull, 2012; Saunders, 2014). Thus, for bank off-balance sheet activities the equation 3.11 can be expressed as mentioned as

$$OBSA_t = \beta_0 + \sum_{n=1}^m (\beta_n (Market\ Power, Performance)_t) \dots \dots \dots (3.12)$$

Bank capital is one of the basic measurements of its creditworthiness (Hassan, 2004). When capital increases the creditworthiness increase which in turn offers more incentives for the engagement in the OBSA (Elian, 2012: Hassan, 2004). Thus equation 3.12 can be explained as

$$OBSA_t = \beta_0 + \beta_1 CAPITAL_t \dots \dots \dots (3.13)$$

Risk diversification decisions of banks are largely dependent upon its size (De Jonghe,, Diepstraten, & Schepens, 2015). The larger banks possess more market power and creditworthy than smaller banks and can take excessive risk in the shape of OBSA (Clark et al., 2018). Hence it can be argued that the growth in bank assets helps the banks in attaining economies of scale and reduce risk and consequently bank may engage in OBSA to earn an additional income, therefore, the equation 3.13 can be expressed as

$$OBSA_t = \beta_0 + \beta_1 CAPITAL_t + \beta_2 SIZE_t \dots \dots \dots (3.14)$$

The profitability of banks offers them more market power (Alhassan et al., 2016) and is one of the basic measures of bank performance (Akhisar, Tunay, & Tunay,2015). Therefore, following the basic definition of modern portfolio, it can be argued that the

profitability is in positive relationship OBSA (Capraru, Ihnatov, & Pintilie, 2018) and equation 3.14 can be expressed as:

$$OBSA_t = \beta_0 + \beta_1CAPITAL_t + \beta_2SIZE_t + \beta_3PROFITIBILITY_t \dots\dots\dots (3.15)$$

The increasing level of loan offers an ambiguous relation with OBSA. The market discipline theory presents two conflicting views. According to one view increase in total bank loan will bring economies of scope which in turn offer more incentive for engaging in OBSA (Khasawneh & Hassan, 2010; Elian, 2012; Al-Tahat and AbuNqira, 2016). Whereas the increasing level of the loan will also increase credit risk and OBSA will be less attractive.

$$OBSA_t = \beta_0 + \beta_1CAPITAL_t + \beta_2SIZE_t + \beta_3PROFITIBILITY_t \pm \beta_4LOAN_t \dots$$

(3.16)

Net loan ratio which is a measure of maturity mismatch between asset and liability and net loan written off which is an alternate measure of non-performing loan place a significant impact on the relationship between the level of loan OBSA. According to market discipline theory if the net loans and net loans written off are decreasing than increasing total loans will be less risk and offer more incentives for engaging in OBSA (Khasawneh & Hassan, 2010; Elian, 2012; Al-Tahat and AbuNqira, 2016). Similarly, the liquidity risk increases the banking risk and effect it creditworthiness (An & Yu,

2018). Thus, incorporating the liquidity risk and credit risk in equation 3.16 we will get the following equation.

$$OBSA_t = \beta_0 + \beta_1CAPITAL_t + \beta_2SIZE_t + \beta_3PROFITIBILITY_t \pm \beta_4LOAN_t - \beta_5LR_t - \beta_6CR_t \dots \dots \dots (3.17)$$

Market concentration reduces competition and bank risk (Phan & Daly, 2016). Theoretically, higher market concentration implies more market power (Khasawneh et al., 2012; Elian 2012; Ma'in et al., 2015; Choi Fedenia, Skiba & Sokolyk, 2017). Thus, in the view of market power theory, the market power is in positive relationship with OBSA, therefore the equation 3.17 can be written as

$$OBSA_t = \beta_0 + \beta_1CAPITAL_t + \beta_2SIZE_t + \beta_3PROFITIBILITY_t \pm \beta_4LOAN_t - \beta_5LR_t - \beta_6CR_t + \beta_7MP_t \dots \dots \dots (3.18)$$

The market power theory consider the OBSA as negative persistent, meaning that the with the increase for bank specific risk, OBSA will decrease and the decrease will be persistent over time. Following Drobetz et al., (2014) persistency of OBSA is captured using one period lag of OBSA. Hence equation 3.18 will become

$$OBSA_t = \beta_0 + \beta_1CAPITAL_t + \beta_2SIZE_t + \beta_3PROFITIBILITY_t \pm \beta_4LOAN_t - \beta_5LR_t - \beta_6CR_t + \beta_7MP_t + \beta_8FEE_t + \beta_9OBSA_{t-1} \dots \dots \dots (3.19)$$

The equation 3.19 represents the mathematical form, of market power theory. The expected signs according to the market power theory are summarized in table 3.2.

Table 3.2
Summary of expected signs (Market power theory)

Variable	Expected Sign
LagOBSA	Positive (+)
Capital	Positive (+)
SIZE	Positive (+)
Profitability	Positive (+)
Loan	Positive (+)/Negative (-)
LR	Negative (-)
CR	Negative (-)
MP	Positive (+)

3.2.3. Regulatory and Tax Hypothesis

The regulatory and tax hypothesis argues that the regulatory tax imposition on bank's on-balance sheet items activities is a major reason behind firms increasing engagement in OBSA (Pavel & Phillis, 1987; Mahoney, Crook, Tully, Strafaci, 2017). The regulator impositions can be in many forms such as reserve requirements, capital requirements, and deposit insurance premium. According to Ahmad (2007), the tax regulatory hypothesis predicts a positive relation between OBSA and regulatory and tax requirements. Many prior findings such as Ahmad (2007), Ahmed and Hassan (2009) and Ahmad et al., (2012) rejected the predictions of regulatory and tax hypothesis and argued that regulatory and tax hypothesis has no significant impact on the usage of OBS items. However, Santos (2011) carried out a study on the impact of growth drivers and regulatory pressure on OBSA undertaken by Philippine commercial banks. While, investigating the impact of regulatory pressure the author has found that the regulatory

pressure has a positive relationship with the OBSA of commercial banks. Thus, the regulatory pressure of any country plays a key role in determining the engagement of commercial banks in OBSA, and mathematically, it can be postulated as equation in 3.20

$$Diversification_t = f((Regulatory Pressure)_t)..... (3.20)$$

Hassan (1991) argued that the amount of OBS items is in direct relation to regulatory and tax cost. He further argued that increasing regulatory and tax pressure offers additional incentives for banks in engaging OBSA.

$$OBSA_t = \gamma_0 + \sum_{n=1}^l (\gamma_n (Regulatory Pressure)_t)..... (3.21)$$

The regulatory and reserve requirements imposed an additional cost which ultimately reduces the banking profit (Ashraf, Arshad, Rahman, Kamal & Khan, 2015). To avoid the cost and risk arising from tax regulation and capital and reserve requirements banks prefer to engage in OBSA (Elian, 2012). The cost of meeting capital reserve requirements and holding non-interest-bearing reserves raises the cost of funds for a bank above what nonbank institutions must pay.

$$OBSA_t = \gamma_0 + \gamma_1 RR_t..... (3.22)$$

The Capital requirement is a regulatory imposition by the central bank of the country and is measured in the capital adequacy ratio (Mathuva, 2009). In capital requirements to protect the depositor's deposit and to ensure the stability of banking sector the banks are advised to hold a buffer of capital (Cohen & Scatigna, 2016; Demir, Banu, Tomasz

& Michalski & Ors, 2017; Moreira & Savob, 2017). Generally, it is argued that banks with a greater volume of risky assets should retain a higher buffer of capital. In support of this argument, it is also argued that. An undercapitalized bank will face the excessive cost of accessing capital, and the overcapitalized bank will face the opportunity cost of holding an excessive amount of capital. All on-balance sheet or traditional banking activities are under capital reserve requirements (Moreira & Savob, 2017). Whereas OBSA is free from regulatory pressure so, to avoid risk arising from increasing regulatory pressure the banks are increasing their engagement in OBSA (Elian, 2012). Thus, following regulatory and tax hypothesis and market discipline hypothesis it can be argued that capital reserve requirement is determined by OBSA carried out in commercial banks of any country.

$$OBSA_t = \gamma_0 + \gamma_1 RR_t + \gamma_2 CAR_t \dots \dots \dots (3.23)$$

The regulatory theory consider the OBSA as positive persistent, meaning that the with the increase for regulatory pressure , OBSA will increase and the decrease will be persistent over time. Following Drobetz et al., (2014) persistency of OBSA is captured using one period lag of OBSA. Hence equation 3.23 will become

$$OBSA_t = \gamma_0 + \gamma_1 RR_t + \gamma_2 CAR_t + \gamma_3 OBSA_{t-1} \dots \dots \dots (3.24)$$

The equation 3.24 represents the mathematical form, of regulatory and tax theory. The expected signs according to the regulatory and tax theory are summarized in table 3.3

Table 3.3
Summary of expected signs (Regulatory and tax theory)

Variable	Expected Sign
LagOBSA	Positive (+)
CAR	Positive (+)
RR	Positive (+)

3.2.4. Market Discipline theory

Market discipline hypothesis promotes the collective approach of all market players in the promotion of transparency in risk disclosure. According to this hypothesis, institution works under the guidelines of the recommended regulatory framework and promote regulated market disciplines. Hence in the case of the market discipline framework the equation 3.24 can be mentioned as

$$OBSA_t = \gamma_0 - \gamma_1 RR_t - \gamma_1 CAR_t \dots \dots \dots (3.25)$$

The equation 3.22 represents the mathematical form, of market discipline theory. The expected signs according to the market discipline theory are summarized in table 3.4

Table 3.4
Summary of expected signs (Market discipline theory)

Variable	Expected Sign
CAR	Negative (-)
RR	Negative (-)

3.3. Regression Models

The study employs specific factors determinants as suggested in the theoretical and empirical literature to determine the effect of bank-specific, macroeconomic and bank-specific regulatory factors on OBSA in commercial Banks of South Asia. To access the

impact of bank specific risk on the OBSA in a saturated South Asian market we have used the mathematical models developed by portfolio theory (3.9) and market power theory (3.17). to access the impact of regulatory restructuring on OBSA we have used the regulatory and tax theory (3.21) and market discipline theory (3.22). To answer the search question, the proposed model is illustrated in the equation 3.23, 3.24, 3.25 and 3.26 below. The model is adapted from the prior studies (Wwain & Panda, 2017; Ma'in et al., 2015; Perera et al., 2014; Elian et al., 2013; Khasawneh et al., 2012; Ahmed et al., 2012; Ahmad & Hassan, 2009; Ahmed , 2007; Nisar et al., 2018) and amended as per the research objectives.

Model 1: Impact of Bank Specific Factors on OBSA

$$OBSA_{it} = \alpha_0 + \alpha_1 CAP_{it} + \alpha_2 SIZE_{it} + \alpha_3 LOAN_{it} + \alpha_4 PROF_{it} + \alpha_5 EFF_{it} + \alpha_6 MP_{it} + \alpha_7 CRISK_{it} + \alpha_8 LRISK_{it} + \varepsilon_{it} \dots \dots \dots (3.26)$$

Model 2: Impact of Bank Specific Regulatory Factors on OBSA

$$OBSA_{it} = \alpha_0 + \alpha_1 CAR_{it} + \alpha_2 RR_{it} + \varepsilon_{it} \dots \dots \dots (3.27)$$

Model 3: Impact of Macroeconomic Factors on OBSA

$$OBSA_{it} = \alpha_0 + \alpha_1 RGDP_{it} + \alpha_2 ISPREAD_{it} + \alpha_3 INF_{it} + \alpha_4 ER_{it} + \alpha_5 LEX_{it} + \varepsilon_{it} \dots \dots \dots (3.28)$$

Model 4: Impact of Bank Specific Factors, Bank Specific Regulatory, and Macroeconomic Factors on OBSA

$$\begin{aligned}
OBSA_{it} = & \alpha_0 + \alpha_1 CAP_{it} + \alpha_2 SIZE_{it} + \alpha_3 LOAN_{it} + \alpha_4 PROF_{it} + \alpha_5 EFF_{it} + \\
& \alpha_6 MC_{it} + \alpha_7 CRISK_{it} + \alpha_8 LRISK_{it} + \alpha_9 RR_{it} + \alpha_{10} CAR_{it} + \alpha_{11} RGDP_{it} + \\
& \alpha_{12} ISPREAD_{it} + \alpha_{13} INF_{it} + \alpha_{14} ER_{it} + \alpha_{15} LEX_{it} + \varepsilon_{it} \dots\dots\dots(3.29)
\end{aligned}$$

3.4. Definition of Variables

The definition of the variables used in the study of their proxies and their rationales are taken from the prior findings and are discussed in table 3.5

3.4.1. Off balance sheet activities (Dependent Variable)

OBSAs entail lending i.e. credit-related products (e.g. loan commitments, letters of credit) and derivatives i.e. risk-management products (e.g. futures, options, and swaps). OBSAs facilitate banks in covering their long-term financial assets and increasing their profitability, thus allowing them to grow their leverage and capitalize on the investment returns (Karim & Chan, 2007). Nevertheless, OBSAs including guarantees intensify bank risks as banks are obliged to make future payments under specific conditions, something that is seemingly adversative to the bank (Hassan, Karels & Peterson, 1993). The assumption made by Mokni and Rllchdi (2014) is that OBSAs enhance profitability as they permit banks to grow their investments and at the same time increase their risk exposures. This variable was measured using the OBSA to total assets ratio as recommended by Khediri et al. (2015), Mokni and Rachdi (2014), Mirzaei et al. (2013), Haq and Heaney (2012), Chen and Liao (201 I), Karim and Chan (2007), Allayammis and Ofek (2001), and Angbazo (1997). The measurement entails the division of total OBSAs with total assets:

$$OBSA = \frac{\text{Off Balance Sheet Activities}}{\text{Total Asset}} * 100$$

3.4.2. Lagged of dependent variable

Lagged one-period OBSA or $[[OBSA]]_{(it-1)}$ is incorporated for capturing the OBSAs' dynamic adjustments. A significant negative coefficient with the $[[OBSA]]_{(it-1)}$ is predicted as banks with higher OBSA engagement in the prior year engage less in the year after. Past studies had used a second or third lag for capturing the dependent variables' dynamic adjustments, but this current study employs only the first lag to prevent lost observations. Using a lagged dependent variable as the explanatory variable could cause the issue of endogeneity and serial correlations (Arellano & Bond, 1991; Arellano & Bover, 1995; Baltagi, 2008).

3.4.3. Bank Specific Factors

3.4.3.1. Credit Risk

The effect of credit risk on the OBSA of banks is captured using the impaired loans to gross loans (NPLs) ratio. Past studies have demonstrated the increase in impaired loans following episodes of increased lending due to the pressure faced by senior bank managers to fulfill short-term profit-oriented targets and to implement less severe lending standards. The quality of the loan portfolio is suggested to have a direct impact on the performance and diversification decisions of banks (Ahmad et al., 2012; Nisar et al., 2018; Ahmad & Hassan, 2009; Ahmad, 2007). A bank's greatest risk entails losses caused by non-performing loans. The NPLs ratio serves as among the best proxies for asset quality or credit risk. Commercial banks primarily aim to maintain a low level of

NPLs. In this current study, the credit risk of conventional banks is captured using the non-performing loan to total assets ratio:

$$\text{Credit Risk} = \frac{\text{Non Performing Loans}}{\text{Total Asset}} * 100$$

3.4.3.2 Liquidity Risk

A crucial determinant of bank performance is liquidity risk (LR) i.e. the likelihood that a bank is unable to adapt in decreasing its liabilities or realizing its gains on the balance sheet (Ayadi & Boujelbene, 2012). According to Dahir et al. (2018) among the biggest challenge faced by banks is the retention of sufficient liquidity. Using a proxy for liquidity ratio in the form of cash and short-term market securities to total asset, the empirical findings on the effect of liquidity on OBSA were found to be inconsistent (Elian, 2012). LR can be calculated using the formula below:

$$\text{Liquidity Risk} = \frac{\text{Cash} + \text{Cash Equivalent}}{\text{Total Asset}} * 100$$

3.4.3.3. Bank Size

Another crucial determinant of performance is bank size (SIZE). A large bank size can lead to economies of scale which lessen the cost of information collection and processing (Boyd & Runkle, 1993). Similar to other studies on banking, this current study also utilizes a proxy for the bank's size in the form of natural log of total assets to justify size-oriented economies or diseconomies of scale. Many researchers have used this proxy in their studies (e.g. Dietrich & Wanzenried, 2014; Chen & Liao, 2011; Fiordelisi & Molyneux, 2010). Bank size in current study is measured as :

$$\text{Bank Size} = \text{Log}(\text{Total Asset})$$

3.4.3.4. Loan to Total Assets

Bank assets are represented by the loans to total assets (LOAN) ratio. A higher LOAN ratio value indicates that the bank has a smaller investment securities portfolio. The ratio also measures the bank's sources of income (Alper & Anbar, 2011). This ratio was used by Kosmidou et al. (2007) to measure liquidity i.e. in determining the proportion of bank assets that is related to loans. The LOAN ratio is also occasionally called by other different terms including loan specialization ratio, liquidity ratio, or asset utilization ratio. To prevent issues of insolvency, a common practice by banks entails holding liquid assets that are easily convertible to cash. This means that when the LOAN ratio is high, the bank's liquidity is low. This measure had been used in numerous studies (e.g.; Lepetit et al., 2015; Sheefeni, 2015; Lee & Hsieh, 2013; Irawati et al., 2019). Lepetit et al. (2015) came to the conclusion that a higher LOAN ratio indicates that the bank is less risky and profitable.

$$\text{Lan Ratio} = \frac{\text{Total Loan}}{\text{Total Asset}} * 100$$

3.4.3.5. Market Power (Herfindahl-Hirschman Index)

Herfindahl-Hirschman index (HHI) is a measure for market concentration that tests the effect of market structure on performance. Two prominent theoretical models suggest that HHI has an effect on OBSA. The market portfolio theory suggests that in a highly concentrated market, banks have the lower tendency to engage in OBSA. The second model is the market power theory, which suggests that a higher margin is caused by

higher operational efficiency, improved management or enhanced production technologies. As banks with higher margins also gain a larger market share, the structure too will gain higher concentration as a result of enhanced efficiency thus banks with higher market power should engage in OBSA.

Alternatively, the degree of banking competition can be determined using the indicators of Rosse Panzar, Lerner index and Boone. Nonetheless, there are some significant limitations to the usage of these non-structural measures. With Rosse-Panzer for instance, bank output has to be effectively substituted (proxy) whilst the entire market equilibrium has to be estimated based on a static model. Several methodological assumptions are needed in estimating market equilibrium, which is something that is beyond the scope of this current study. Therefore, with such limitations in mind, this current study continues with the usage of the HHI of market concentration index .Market concentration is measured by the HHI index which is equivalent to the sum of the squares of each bank's market share in total industry assets (see Al-Khoury & Arouri, 2019; Chen & Liao, 2011; Seelanatha, 2010). The HHI index is calculated using the formula below:

HHI = Sum of the Squared Market Shares of Each Bank Assets =

$$HHI = \sum \left(\frac{\text{Bank total Asset}}{\text{Banking Sector Total Assets}} * 100 \right)^2$$

3.4.3.6. Capital

A The effect of non-traditional activities on the profitability of banks has been empirically investigated in several studies (Perera et al., 2014; Hassan & Sackley, 2006). A bank's ability to absorb losses from on- and off-balance sheet activities prior to becoming insolvent is measured using the bank capital to asset ratio. A highly capitalized bank is deemed to have greater creditworthiness and higher OBS items guarantee (Hassan, 2006). Due to that, a positive relationship is projected between capital and OBSA. Capital entails the modified equity capital to total asset ratio, whilst modified capital is made up of mainly common stocks, perpetual preferred stocks and retained earnings. Using the market power theory, Komorowska (2017) asserted that banks with overcapitalization engage more in OBSAs. In the context of South Asian banks, Perera et al. (2014) capital significantly and positively affects OBSA. In that study, bank capital uses the proxy of modified equity capital to total asset ratio.:

$$CAP = \frac{\text{Modified Equity Capital}}{\text{Total Assets}} * 100$$

3.4.3.7. Profitability

Many studies had empirically investigated the relationship between non-traditional activities and bank profitability (e.g. Chiorazzo et al., 2008; Demirgüç-Kunt & Huizinga, 2010; DeYoung & Rice, 2004; Meslier, Tacneng & Tarazi, 2014; Stiroh & Rumble, 2006). Banks that diversify into non-traditional activities have the intention of improving their revenues and earnings following a decline of income from traditional means. In short, non-traditional income comprising fees, trading income, and

commissions are projected to enhance the performance of commercial banks especially in terms of profitability. Bank profitability was determined using the proxy of net profit after taxes to total assets ratio.

$$Prof = \frac{Net\ Profit\ After\ Tax}{Total\ Assets} * 100$$

3.4.3.8. Fee Based Income

The focus on non-traditional banking activities is measured using the share of non-interest revenue to total revenue (FEE) ratio. Being a non-exogenous variable reflecting the strategic choices and business prospects of banks, the FEE can be used to investigate the historical link between revenue and non-interest activities (Hardiantom & Wulandari, 2016). Lin and Zhang (2009) used the variable to examine business orientation whilst Vikneswaran et al. (2020) asserted that although FEE is less stable than interest income, it offers banks the ability to diversify their income streams. Many financial institutions of today generate income via OBS businesses, especially by trading in stock markets using derivative financial instruments and fee income. FEE share is computed as FEE ratio (see SaghiZedek & Tarazi, 2014; Grawe et al., 2014; Chen & Liao, 2011; Lin & Zhang, 2009; Vikneswaran et al., 2020). FEE share comprise the commissions, service charges, fees, guarantee fees, and net profits from investment securities sales and foreign exchange profits. FEE is calculated using the formula below:

$$FEE = \frac{Income\ form\ OBSA}{Total\ Income} * 100$$

3.4.4. Bank Specific Regulatory Factors

3.4.4.1. Capital Adequacy Ratio

The capital strength of a bank is measured using the capital adequacy ratio (CAR) which entails the equity to assets ratio. Commercial banks are required by financial regulators to retain a minimum level of CAR as an assurance that the banks will have adequate amounts of equity to absorb unexpected shocks. The 1988 Accord of the Basel Committee on Banking Supervision specifies the minimum capital requirement as a proportion of the banks' risk-weighted assets which is measured using Tier I or the total capital ratio. With the newly established Basel II and III accords, no changes were made to the definition of capital and the 8 percent minimum capital requirement despite the supplementation of the current credit risk and market risk categories by a third risk category i.e. operational risk which must be unequivocally supported by capital in the future. Berger (J 995b) is one of many who assert the idea that banks with high capitalization have cheaper access to fund sources along with improvements in profit rates. In this current study, it would probably be more appropriate to use risk weighted capital ratios like Tier I or (Tier I+ Tier II) divided by risk-weighted assets, but the excessive missing values in the dataset rendered the use of the equity to assets ratio (CAR) more practical. CAR has been used since the 1900s and is deemed as among the traditional ratios for capital strength (Golin, 2001). It has been widely used in numerous banking studies (e.g. Alfadli & Rjoub 2019; Kosmidou et al., 2007; Goddard et al., 2008; Liang et al., 2013; Dietrich & Wanzenried, 2014).

$$CAR = \frac{(Tier\ 1\ capital + Tier\ 2\ Capital)Equity}{risk\ weighted\ Asset} * 100$$

3.4.4.2. Reserve Ratio

Reserve requirement is measured using the reserves ratio. Based on past studies, reserve requirement is expected to have a positive effect on OBSA. According to the regulatory tax theory, reserve requirements are the main determinants of a bank's OBSA and that they rise regulatory pressure and serve as a bottleneck. Commercial banks pursue OBSAs to make up for lost income and to tackle increasing operating costs. Hassan (2006) indicated that reserve requirement positively affects OBSA; based on that finding, this current study utilizes the total reserve to total assets ratio as proxy for bank reserves. Following Hassan (2006), the current study has used total reserve to total assets as a proxy of Bank reserves

$$RR = \frac{\text{Total Reserves}}{\text{Total Asset}} * 100$$

3.4.5. Macroeconomic Factors

3.4.5.1. GDP Growth Rate

This is one of the most widely used macroeconomic indicators. It measures all economic activities that are projected to affect the multiple factors that drive the supply and demand for loans and deposits. According to Bongini et al. (2017), economic development crucially determines the domestic market entrance of foreign banks. GDP growth is indicated as a control measure for the variances in a macroeconomic surrounding. Flamini et al. (2009) used GDP growth to control the impacts of the cyclical output; the authors also found that a decline in GDP cycles leads to lower profitability. Dietrich and Wanzenried (2014) indicated a statistically significant and positive relationship between GDP growth and bank performance in the context of mid-

and high-income nations. Many past studies had suggested the crucial role of economic growth in driving OBSAs (e.g. Ma'ina et al., 2015; Karim et al., 2013; Ahmad et al., 2012; Elian, 2012; Ahmad, 2007; Ahmad & Hassan, 2009; Nachane, Ray & Ghosh, 2007). The abovementioned studies had indicated two contrasting theories with regards to the relationship between economic growth and OBSA. The first theory suggests that both the variables are positively correlated, thus justifying the notion that economic cycle proliferates business transaction which in turn boosts the demand for OBSA. The second theory proposes a negative correlation between economic growth and OBSA and the notion that banks are facilitated in earning the projected profits rendering them to evade OBSA (Nisar et al., 2018). The GDP growth rate is employed in this current study following its wide usage in numerous past researches (e.g. Dietrich & Wanzenried, 2014; Saghi-Zedek & Tarazi, 2014; Lee & Hsieh, 2013; Chen & Liao, 2011; Flamini et al., 2009; Kosmidou et al., 2005; Ma'ina et al., 2015; Karim et al., 2013; Ahmad et al., 2012; Elian, 2012; Ahmad, 2007; Ahmad & Hassan, 2009; Nachane, Ray & Ghosh, 2007).

$$GDP = \text{Real GDP growth rate}$$

3.4.5.2. Inflation Rate

This current study also addresses macroeconomic risk via inflation rate (INF) control, by measuring the growth rate of the current period's consumer price index (CPI) (see Dietrich & Wanzenried, 2014; Lee & Hsieh, 2013; Chen & Liao, 2011; Flamini et al., 2009). The impact of INF on bank performance is determined by whether the INF is expected or unexpected . When the INF is expected, interest rates can therefore be

adjusted with the aim to positively affect performance; the opposite occurs when the INF is unexpected. Demircukunt and Huizinga (2000) indicated a significant and positive relationship with INF, thus suggesting the likelihood of banks to make profits out of inflationary conditions. The measurement of INF is as follows:

$$\text{INF} = \text{Inflation rate (Consumer price index)}$$

3.4.5.3. Interest Rate spread

Another significant determiner of OBSA is interest rate spread. It has been indicated that interest rate spread (as per net interest margin) is positively correlated with OBSA, suggesting the improbability of whether future interest rates will pose any added risks on the banks' projected returns. Such risks are mitigated by engaging in OBSA which banks deem as a tool for managing risks (Ahmad, 2007). Yet, there is still ambiguity with regards to the effect of interest rate spread on OBSA which means that it could also turn out to be negative, particularly when the spread is experiencing an increase (e.g. when the bank's lending rate is high, but borrowing rate is low). Such condition facilitates banks in achieving their projected returns (Ahmad, 2007). In the international context, Ahmad (2007) discovered that interest rate margin negatively affects OBSA and vice versa. In the case of banks in Africa, North America and G7 countries, the same author revealed a positive correlation between net interest margin and OBSA. Yet, in the context of MENA commercial banks, Ahmad and Hassan (2009) found that the relationship between interest rate spread and OBSA is statistically insignificant. This shows that when deciding on OBS contracts, banks will disregard ambiguous future interest rates. The measurement of interest rate spread is as below :

IRSPREAD = Net interest income to total asset

3.4.5.4. Export

Export is crucial for the economic development and progress of a nation (Papanek, 2019). Export activities produce various OBS items including loan guarantees, loan commitment and financial guarantees (Cowling et al., 2019). Evidence of any relationship between export level and OBSA is not provided in existing literatures, but by considering the significance of non-traditional banking activities in trade, inference can be made that dwindling export levels and growing budget deficits could be the factor for decreasing OBSAs in South Asia. The measurement of Export is as follows :

LEX: Values of exports of goods and services as a ratio of GDP

3.4.5.5. Exchange Rate

This is the rate at which countries are trading on the foreign exchange market (Hussain et al., 2017), which typically uses US dollar as the standard measure for determining the exchange rate. According to Bradley and Moles (2002), exchange rate entails the unit price of a certain foreign currency against a certain domestic currency. Reid and Joshua (2004) defined exchange rate as the value per unit of a foreign currency against a local currency. Similar to any commodity, exchange rates are argued to be explainable by the demand and supply rule. Currency supply is expounded by fiscal policy changes whilst currency demand is driven by numerous factors including inflation rates and interest rates. The correlation between exchange rate and OBSA in the context of commercial banks remains uncharted. No studies have been conducted

on this subject as far as the author is concerned. Despite numerous studies on the relationship between exchange rate and bank performance based on various theoretical models, the relationship between income diversification and exchange rate remain largely unexplored. The measurement of exchange rate is as:

Exchange Rate = The standard deviation of the charges against the United States Dollar)

Table 3.5
Summary Definition of Variables

Variable	Proxy	Measurement	Source
<i>Off-Balance Sheet Activities</i>	<i>OBSA</i>	<i>Off-balance Sheet activities to total asset</i>	Ma'in et al. (2015), Elian, (2012), Ahmad et al. (2012), Ahmad and Hassan (2009)
<i>Capital</i>	<i>CAP</i>	<i>Modified equity capital to the total asset.</i>	Perera et al. (2014), Hassan and Sackley (2006)
<i>Bank Size</i>	<i>SIZE</i>	<i>Natural log of Total Asset</i>	Ma'in et al. (2015), Perera et al. (2014), Elian, (2012), Ahmad et al. (2012), Hassan and Sackley (2006)
<i>Loan Ratio</i>	<i>LOAN</i>	<i>Total loan to total assets</i>	Ma'in et al. (2015), Perera et al. (2014), Elian, (2012), Ahmad et al. (2012), Hassan and Sackley (2006)
<i>Profitability</i>	<i>PROF</i>	<i>Net profit before tax/total assets</i>	Nisar et al. (2018), Ma'in et al. (2015), Perera et al. (2014), Elian, (2012), Ahmad et al. (2012), Hassan and Sackley (2006)
<i>Market Concentration</i>	<i>HHI</i>	<i>Herfindahl–Hirschman index</i>	Elia (2013), Santos (2011)

<i>Credit Risk</i>	<i>CR</i>	<i>Net loan written-off to total asset</i>	Ahmad et al. (2012), Nisar et al. (2018), Ahmad and Hassan (2009), Ahmad (2007)
<i>Fee Based Income</i>	<i>FEE</i>	<i>Income form OBSA to total income</i>	Meng, Cavoli, and Deng, (2018), Nisar et al. (2018), Elian (2013)
<i>Liquidity Risk Reserve Requirement Capital Adequacy Requirement</i>	<i>LR</i> <i>RR</i> <i>CAR</i>	<i>cash to total assets</i> <i>Reserve ratio</i> <i>Total capital/risk weighted Asset</i>	Hassan and Sackley (2006) Elia (2013), Ahmad and Hassan (2009), Ahmad (2007), Hassan (1991)
<i>Economic Growth</i>	<i>RGDP</i>	<i>Real GDP growth rate</i>	Elia (2013), Ahmad et al. (2012), Nisar et al. (2018), Ahmad (2007), Ahmad and Hassan (2009) and Nachane and Ghosh (2007)
<i>Interest Rate Spread</i>	<i>IRSPREAD</i>	<i>Net interest income to total asset</i>	Ahmad and Hassan (2009) Ahmad (2007)
<i>Inflation</i>	<i>INFL</i>	<i>Inflation rate (Consumer price index)</i>	Ahmad (2007), Nisar et al. (2018),
<i>Exchange Rate</i>	<i>ER</i>	<i>The standard deviation of the charges against the United States Dollar)</i>	Boon and Hook (2017)
<i>Level of Export</i>	<i>LEX</i>	<i>values of exports of goods and services as a ratio of GDP</i>	Akyüz (2011)

3.5. Research Approach

The research design refers to a strategic choice which you made to make the different components of the study coherent and logical. Meanwhile, it also ensured

that the research problem is solved, and the research objectives are achieved. As the prime objective of this study is to check the hypothesized relation between bank-specific factors, bank-specific regulatory and macroeconomic factors which affect the OBSA in selected South Asian commercial banks. In other words, hypothesis testing is conducted to explain the variance in the dependent variable or predict certain outcomes in organizations. In some cases, it may establish cause and effect associations or relationships (Sekeran & Bougie,2009).

Therefore, following Sekeran and Bougie (2009), the argument that hypothesis testing usually explains the nature of the relationship among a group of variables we will be employing hypothesis testing technique Hence, this form of investigation enhances the understanding of the link or relationship that exists among variables. More importantly, hypothesis testing can be done with both qualitative and quantitative data. Notably, the basic research design for this study is quantitative data analysis.

3.6. Sample Selection

For the study, the target population would be all commercial banks registered by State Banks of selected south Asian countries and under operation in the country currently. In this study, the sample frame consists of all conventional banks in selected south Asian countries namely Pakistan, India, Bangladesh, and Sri Lanka during the period from 2013 to 2017. According to the 2015 annual reports issued by the central banks in all Selected south Asian countries, the banking sectors in

these countries comprises of 121 banks. Therefore, currently, there are 121 conventional commercial banks in four countries, namely Bangladesh, India, Sri Lanka and Pakistan. The sample size is 101 banks, which are around 83.4 percent of the total population. The reasons why we have chosen this time span is that the financial restructuring in South Asian countries in the form of BASEL III happened after 2013. The detail of country wise sample distribution is as follow. The reason why we have excluded the Islamic banks as one of the sample country India has not allowed the Islamic banks to operate

Table 3.6
Sample distribution

Country	Total Conventional commercial banks	Sample conventional banks
Bangladesh	33	28
India	35	32
Pakistan	26	21
Sri Lanka	27	20
Total	121	101

3.7. Data and Data Sources

The study used secondary sources of data. The secondary data bank-specific factors will be collected from the annual report of the banks, whereas the data of regulatory and economic factors will be collected from the database of the World Bank. The study period covers from 2013 to 2017. The researcher believes five years would

be sufficient to track the growth of OBS activities for the unbalanced panel data because of the two reasons. Firstly, the Basel III has implemented in these countries after 2013 and secondly if too long a period is chosen, the bank's specific OBS activities become less meaningful because of changes in management and other events.

3.8. Diagnostic Test

3.8.1. Normality Test

In multivariate analysis, this test is the fundamental assumption for multivariate analysis. The test calculates the degree of the normal distribution of the sample data. As suggested by Kozak, & Piepho (2018) residual plots (the difference between the observed and predicted values for the dependent variable) and statistical tests are used to examine the normality of the data. However, for panel datasets that exceeds 400 observations, normality of the residuals and the variables are no longer of concern and the normality assumption can be relaxed (Wooldridge, 2003).

3.8.2. Multicollinearity Tests

A logical way to detect multicollinearity problem is through the correlation coefficient of variables. When the value of the correlation coefficient is large, the problem of Multicollinearity might emerge, even though there is a problem of defining the values considered as large, Asteriou and Hall (2007) and Tabachnic

and Fidell (2007) considered the value of 0.5 as the threshold beyond which multicollinearity problem is likely to occur. However, in this study we use the benchmark of 0.8 level of correlation as detection for the existence of multicollinearity as suggested by Gujarati and Porter (2009). The correlation matrix shows that there is multicollinearity that exceeds 0.8 between Loan Ratio and Liquidity Risk. Accordingly, we have chosen to drop Loan Ratio from our model because liquidity ratio and credit risk

When two or more variables are correlated, they contain redundant information, and not all the information is needed in the same analysis. The redundant information increases or inflates the size of the error term and therefore weakens the analysis. To treat the problem of multicollinearity, according to Asterious and Hall (2007) and Tabachnick and Fidell (2007), the variables are transformed to log. By logging them, the problem of imperfect multicollinearity is treated.

The use of regression in the linear equation is to find out the effect of dependency; the purpose is not to find out an interdependency of relationships. Multicollinearity affects both specification and efficient estimation of the linear relationship among dependent and independent relationships (Farrar & Glauber, 1967). The primary objective of this test is to measure the correlation among several independent variables.

As an extra post-estimation test, we report for each model the Variance Inflation Factor (VIF) to detect the level of collinearity. This test relies on the tolerance value

of the estimated model. Wherein the tolerance value indicates the variability of the specified independent variable that is not explained by the other independent variables in the model. Tolerance value that is less than 0.10 imply multicollinearity problem (multiple correlations with other variables is high). The VIF is calculated by regressing each x variable on the other x variables using the following equations

$$VIF = 1/(1 - R_2)$$

where R_2 is the R-squared value for that x's regression on the other x variables.

VIF value is the inverse of the tolerance value, whereby VIF values above 10 indicate multicollinearity problem (Farrar & Glauber, 1967; Thompson et al., 2017). Following Katrutsa, and Strijov, (2017). and Farrar and Glauber (1967), the study has estimated VIF and correlation matrix to detect multicollinearity for commercial banks in South Asia.

3.8.3. Heteroskedasticity Problem

The idea of the post-estimation modified Wald test for the heteroskedasticity is to assess the difference between restricted model and the unrestricted version of the model. If the restriction does not affect the fit of the model very much, it is accepted as being valid. But if the model fit is much worse, the model is rejected. The measure of how much worse a model fit can get and still be significant comes from the likelihood function that is how likely the model is correct. According to Asterious and Hall (2007), the exact way to form the test is based on the taking twice the difference between the likelihood function of the restricted and

unrestricted model, the value will have χ^2 distribution with the number of degree of freedom equal to the number of restriction imposed on the model. Sometimes the heteroskedasticity test estimates the restricted model and uses the procedure to approximate the full likelihood ratio. The test uses the following formulas to test the null (Panel homoskedasticity) against the alternative (Panel heteroskedasticity) hypothesis,

Wald Test:

$$\text{Log}E_2 = X$$

Adjusted R_2 :

$$R_{2-a} = (1 - R_2) * (N - 1)/(N-K-1)$$

and

$$F\text{-Test} = R_2 / (1 - R_2) * (N - K - 1) / (K)$$

Where R_2 , R_2 Adjusted, and F-Test, are obtained from 4 ways, raw moments R_2 , squared correlation between predicted (Y_h) and observed dependent variable (Y), and ratio of variance between predicted (Y_h) and observed dependent variable (Y).

3.8.4. Autocorrelation / Cross sectional Dependence

Test autocorrelation refers to the correlation between members of a series of observations ordered in time (as in time series data) or space (as in cross-sectional data) (Gujarati, 2003). For panel dataset analysis, a common concern arises that is related to the fact that the different cross sections might not be independent. This means that the factors that influence how banks respond to financial or market

shocks are connected and related. Since our sample include countries mainly in the same geographical region, Asia. This in turn means these countries experience an ever-increasing economic and financial integration of different forms, which implies strong interdependencies between cross-sectional units should exist. The impact of cross-sectional dependence on a variety of factors, such as the nature of the cross-sectional dependence itself. If the cross-sectional dependence is caused by unobserved common factors that are not correlated with the independent variables in our models, then the standard fixed-effects (FE) and random-effects (RE) estimators can control for these interdependencies. However, if these factors that cause cross sectional dependence are in fact correlated with the regressors then the FE and RE estimations are biased and not efficient (Driscoll & Kraay, 1998).

We test for cross sectional dependence after each Fixed Effects model using pearson test. This test examines the hypothesis of cross-sectional independence at small T and large N panel data sets via implementing two semi-parametric tests proposed by Friedman (1937) and Bailey et al (2016) also the parametric testing procedure proposed by Pesaran (2004), Wursten, (2017), and Pesaran (2015).

In the context of seemingly unrelated regressions estimation, Breusch and Pagan (1980) proposed a Lagrange Multiplier (LM) statistic, which is valid for fixed N as $T \rightarrow \infty$ and is given by

$$LM = T \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij}^2$$

where $\hat{\rho}_{ij}$ is the sample estimate of the pair-wise correlation of the residuals

$$\hat{\rho}_{ij} = \hat{\rho}_{ji} = \frac{\sum_{t=1}^T \hat{u}_{it} \hat{u}_{jt}}{(\sum_{t=1}^T \hat{u}_{it}^2)^{1/2} (\sum_{t=1}^T \hat{u}_{jt}^2)^{1/2}}$$

and \hat{u}_{it} is the estimate of u_{it} in (1). LM is asymptotically distributed as chi-squared with $N(N - 1)/2$ degrees of freedom under the null hypothesis of interest. However, this test is likely to exhibit substantial size distortions in cases where N is large and T is finite – a situation that is commonly encountered in empirical applications, primarily due to the fact that the LM statistic is not correctly centered for finite T and the bias is likely to get worse with N large. Pesaran (2004) has proposed the following alternative:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N \hat{\rho}_{ij}^2$$

The test results show that cross sectional dependence exists between the cross sections. Possible remedy for balanced panel data sets is using Feasible Generalised Least Squares (FGLS) and the Panel Corrected Standard Error (PCSE). But since our panel data sets are unbalanced, we use the robust and clustering option after every model. We cluster our panel data across banks in every one of the four countries also for the aggregate dataset and estimate our clustered models accordingly using Fixed effects regression method (De Hoyos & Sarafidis, 2006).

Additionally, it is argued that the dynamic relationships in time-series panel data are characterized by the presence of a lagged dependent variable among the regressors. Therefore, there is autocorrelation due to the presences of lagged dependent variables among the regressors and individual effects characterizing the heterogeneity among the individuals in time-series panel data. With time-series data, successive observations are likely to be correlated. Changes in variables, for instance credit risk, liquidity risk, exchange rate are usually more gradual than abrupt; their values in one period will depend on what happened in the previous period. This dependence means that a credit risk indicator correlates with each other in the previous period. When a variable exhibits such correlation over time, it is term as autocorrelation or serially correlation. The two terms are used interchangeably. According to Hill et al. (2011), different observations in a cross-section data set, collected by way of a random sample, are typically uncorrelated. The models are therefore not free from autocorrelation. In a nutshell, as a result of the problems of both heteroscedasticity and autocorrelation presence among the variables. Thus, considering the issue, the study has undergone the autocorrelation examination by using Pearson test as well as, Arellano-Bond test for zero autocorrelation which has estimated in the GMM analysis of the work and they are reflected in chapter four.

3.8.5. Hausman specification test

The Hausman specification test provides an answer for a suitable panel model to choose. This is important because of the strict panel regression assumptions of the

random effects model, which assume that there is no correlation between individual error components and no autocorrelation across the cross sectional and time series units (Gujarati & Porter, 2015). If the assumption is not met, the use of the REM will result in an inconsistent estimation. Hence, the Hausman specification test compares the coefficient of the FEM and REM.

H_0 : Random effects are consistent and efficient

H_1 : Random effects are inconsistent and inefficient that, the fixed effect is consistent and efficient.

If the Chi-square χ^2 probability value is significant, the null hypothesis will be rejected, and fixed effect model will be more consistent and efficient.

3.8.6. Breusch and Pagan Lagrangian Multiplier Test

Breusch-Pagan Lagrange multiplier test, whose null hypothesis is that the variance of the unobserved fixed effects is zero. If this occurred, then pooled OLS might be the appropriate model instead of Fixed Effects (FE) or Random Effects (RE) model.

The first stage of panel data analysis requires the researcher to prove that the REM is significant, and that the variance is not zero (0) (Baltagi et al., 2005). This validity assumption signifies that the model contains an unobserved effect (Wooldridge, 2002). If the criteria are not met (variance is zero), then the REM is not appropriate

(Gujarati & Porter, 2015). In that case, the constant variance model is valid and would provide superior results. The Lagrangian Multiplier test provides the answer to determine the significance of the chi-square (μ^2) for the REM (Breusch & Pagan, 1980).

H_0 : There are no individual differences that are, no random effect.

H_1 : There is an individual difference between the coefficient that is, random effect exists.

If the null hypothesis is rejected, random effect exists and if null hypothesis accepted than the random effect does not exist, thus pooled OLS would be more appropriate.

3.9. Estimation Methodology

This section explains the methods adopted in the analysis of the data to achieve the objectives of the study. This study used both static and dynamic panel data analysis. The study basically employs panel data analytical tools in achieving the set goals of the research. The choice of panel data approach is informed by a number of methodological advantages it offers. For example, Asterious and Hall (2007) postulates that panel data allows for exploration of many effects that are otherwise unidentifiable using cross-section and time series data.

However, it is important to note that panel longitudinal data gives room to examine crucial researchable questions that cannot be covered or cater for using times series or cross section (Hsiao, 2007; Baltagi, 2008; Hsiao 2014). The panel data analysis

is the most suitable to capture the variations over time of the performance indicators. Similarly, it controls individual country specific heterogeneity as well as the changes in the countries operating environment as is applicable to this study.

This study employs different panel estimation methodologies to model the econometric relationship between the bank off balance sheet activities (*OBSA*) and a set of independent variables. These variables are classified within three sets: bank specific factors, bank regulatory factors, and macroeconomic factors. Generally, our econometric analysis will follow the general to a specific approach, wherein we start with a general model that include all the determinants of the off-balance sheet activities in our study. Then we start simplifying the model by following the prior classifications of the independent variables within the three categories.

Panel data have the advantage of uncovering dynamic relationships in econometric analysis. In the words of Nerlove (2002), economic behavior is inherently dynamic; therefore, the relationships are implicitly or explicitly dynamic. Therefore, panel data has the more accurate inference of model parameters. It also has greater capacity for capturing the complexities of a unit of analysis than a single time series or cross-section data. These attributes of panel data, according to Ben-Porath (1973), including constructing and testing more complicated issues. Nevertheless, it is important to note here that objective one to objective five; both the static and dynamic panel data analysis was used through stat techniques for the assessment and possible recommendations proffered. Using panel data has several merits, like providing more data points and higher degrees of freedom. Also, panel estimations

give more information by considering the heterogenous nature of the cross sections, unlike time series and cross section models (Baltagi, 2008). Yet panel data models carry several challenges that are important to be considered for getting accurate results. One challenge arises when dealing with panel data that is the omitted variables bias. This bias arises from ignoring the time invariant traits of each of the cross section. These unobservable effects are difficult to be assessed or quantified, yet not accounting for them might lead to flawed statistical inferences (Baltagi & Pinnoi, 1995).

Conventional panel model analysis starts with the pooled Ordinary Least Square (OLS) estimations that ignore the heterogeneity among cross sections leading to inefficient and biased estimates (Gujarati & Porter, 2009). To decide if this methodology is useful to be implemented in our analysis or not, we apply the Breusch-Pagan Lagrange multiplier test, whose null hypothesis is that the variance of the unobserved fixed effects is zero. If this occurred, then pooled OLS might be the appropriate model instead of Fixed Effects (FE) or Random Effects (RE) model.

The first stage of panel data analysis requires the researcher to prove that the REM is significant, and that the variance is not zero (0) (Baltagi et al., 2005). This validity assumption signifies that the model contains an unobserved effect (Wooldridge, 2002). If the criteria are not met (variance is zero), then the REM is not appropriate (Gujarati & Porter, 2015). In that case, the constant variance model is valid and would provide superior results. The Lagrangian Multipliertest provides the answer

to determine the significance of the chi-square (μ^2) for the REM (Breusch & Pagan, 1980). The results of the Breusch Pagan Lagrangian Multiplier test for the institutional quality and human development are shown in Chapter 4

Following LM test results, our models are estimated using the FE panel methodology to account for banks' time-invariant unobservable measures that would affect the dependent variable (*OBSA*), an example for those related to their geography, distance from big business hubs, bank management system, marketing strategy (Baltagi et al., 2005). This method also accounts for time fixed effects which capture global financial stocks that have impacted the banks in our analysis. For testing the robustness of the results and its sensitivity to the change of the applied methodology, we shall use two-way error component fixed effects model, allowing both time and cross section intercepts to vary.

Another concern regarding our panel model is the issue of endogeneity (Perera et al., 2014). This two-way directional relationship is not accounted for in the FE models. Endogeneity also could arise from the omitted variables that are captured by the error term. As long as these unobservable variables are time-invariant, the FE method in our study can address them (Imai, & Kim, 2019). However, if these factors are time-variant, then one should find an estimation methodology that can control for these drivers of simultaneity. We then employ the Generalized Method of Moments (GMM) method that is useful in two ways, first it will allow us to estimate a dynamic model wherein we include the lagged of the dependent variable at the right-hand side, as the off-balance sheet activities are likely to be affected –

beside other variables- by activities in the previous period. Also, it uses lagged values of explanatory variables (in levels and differences) to instrument the potential endogenous variables (Arellano & Bond, 1991).

3.9.1. Fixed effects

The FE estimation captures banks heterogeneity by allowing each bank's bank off balance sheet activity to have its own interpret while restricting the slope to be constant (Nisar et al., 2018). This heterogeneity parameter $\beta_{i,t}$ is expressed in the two-way error specification

$$\beta_{i,t} = \lambda_t + \mu_i + \varepsilon_{i,t} \dots\dots\dots (3.27)$$

$\varepsilon_{i,t}$ is assumed to be independent and identically distributed variable with zero mean and variance. While, μ_i is each bank specific effects and it is time invariant, while λ_t is the time specific effects. Fixed effects method is then used when the covariance between each of the bank specific factor term and any of the regressors is not zero. The fixed effects estimator then proceeds by removing the problematic terms λ_t & μ_i and estimate the model using OLS. Removing these terms requires what is known as within transformation which relies on differencing the two sides of the equation by its mean .

$$(y_t - \hat{y}_{i,t}) = \beta (x_t - \hat{x}_{i,t}) \dots\dots\dots (3.28)$$

The empirical analysis starts with four basic specifications that are conveyed from a general aggregate model to rather more specific versions. Wherein the first model

3.29 represents the aggregate from and incorporates the complete list of the independent variables, the second model 3.30 contains the bank specific factors, the third model 3.31 contains bank regulatory factors and the final model 3.32 contains the macroeconomic determinants only. All these panel models incorporate one dependent variable, which is the off-balance statement activity (*OBSA*) in a linear function with the independent variables. The subscripts *i* denote the bank ID in the four countries (101 banks), *t* denotes time (2013-2017), ε_i are the observation-specific errors, λ_t are the time specific effects, and μ_i are unobserved individual-specific effects.

$$\begin{aligned}
 OBSA_{i,t} = & \alpha_0 + \alpha_1 CAP_{it} + \alpha_2 SIZE_{it} + \alpha_3 LOAN_{it} + \alpha_4 PROF_{it} + \alpha_5 FEE_{it} + \\
 & \alpha_6 MP_{it} + \alpha_7 CRISK_{it} + \alpha_8 LRISK_{it} + \alpha_9 RR_{it} + \alpha_{10} CAR_{it} + \alpha_{11} RGDP_{it} + \\
 & \alpha_{12} ISPREAD_{it} + \alpha_{13} INF_{it} + \alpha_{14} ER_{it} + \alpha_{15} LEX_{it} + \mu_i + \lambda_t + \\
 & \varepsilon_{i,t} \dots \dots \dots (3.29)
 \end{aligned}$$

$$\begin{aligned}
 OBSA_{it} = & \alpha_0 + \alpha_1 CAP_{it} + \alpha_2 SIZE_{it} + \alpha_3 LOAN_{it} + \alpha_4 PROF_{it} + \alpha_5 FEE_{it} + \\
 & \alpha_6 MP_{it} + \alpha_7 CRISK_{it} + \alpha_8 LRISK_{it} + \mu_i + \lambda_t + \varepsilon_{i,t} \dots \dots \dots (3.30)
 \end{aligned}$$

$$OBSA_{it} = \alpha_0 + \alpha_1 CAR_{it} + \alpha_2 RR_{it} + \mu_i + \lambda_t + \varepsilon_{i,t} \dots \dots \dots (3.31)$$

$$\begin{aligned}
 OBSA_{it} = & \alpha_0 + \alpha_1 RGDP_{it} + \alpha_2 ISPREAD_{it} + \alpha_3 INF_{it} + \alpha_4 ER_{it} + \alpha_5 LEX_{it} + \\
 & + \mu_i + \lambda_t + \varepsilon_{i,t} \dots \dots \dots (3.32)
 \end{aligned}$$

Fixed effects as discussed earlier is useful in considering cross sections heterogeneities when estimating each one of the above equations. Also, it reduces

omitted variables biases that could arise when the time invariant factors related to each bank that could affect OBSA are not controlled for such as bank management systems, marketing strategies, geography, climate, official language, etc. Each one of the previous equations is estimated using country and time fixed effects.

Running the equations using country and time fixed effects means that the models incorporate a dummy for each year (2013-2017) and for every cross section (101 banks). Accounting for time fixed effects captures global shocks that could have happened during the investigated the time span and have affected simultaneously the banking systems of the four countries like for example the BASEL III adoption. Country fixed effects captures time invariant heterogeneities across countries that affect the dynamic relationship between the variables in consideration. In our fixed effects estimations, we also use white's cross-sectional clustered errors that are robust to heteroskedasticity and serial correlation (White, 1980).

Applying the fixed effects methodology in the current general to specific models' specification is useful to address this research's objectives as mentioned in section. Considering the banks and countries heterogeneities while estimating each one of the predetermined set of equations allow us to accurately identify the econometric effects of each set of the independent variables on OBSA. For example, model 3.29 that comprises the bank specific actors set of independent variables address directly objective 1 as it investigates the magnitude and the direction of the econometric relation between each one of the of the bank specific factors such as bank size, Loan and advances, profitability, efficiency, etc. and OBSA.

Similarly, the fixed effects models 3.31 and 3.32 contain bank regulatory factors set of independent variables and the macroeconomic determines set of independent variables respectively. These equations address directly objectives of the study while considering the unique characteristics of each bank. The former model identifies the magnitude and direction of the bank regulatory factors namely reserve requirement and capital adequacy ratio on OBSA. While the latter studies whether there exists an econometric effect of the macroeconomic setting of each country such as level of exports, interest rate spread, GDP, etc on the volume of OBSA. Above and beyond, the aggregated specification 3.3 that comprises the complete set of the independent variables is useful to study the econometric dynamics of the three sets together and trace any changes in the magnitude and sign of the individual coefficients.

3.9.2. GMM

Most economic relationships are dynamic, and the advantage of panel data is allowing the dynamic adjustment. For instance, work of Baltagi and Levin (1986) on a dynamic demand for addictive commodities, Blundell et al. (1992) on dynamic model of company investment and Arellano and Bond (1991) on the dynamic model of employment. The GMM is developed to check the limitations and shortcomings of the simple panel data estimation observed.

Given these biases in use of OLS and fixed effect regression, this study, in line with the suggestions of Arellano and Bond (1991), uses the Difference Generalized

Method of Moments (GMM) to estimate the dynamic model. Difference GMM estimator is designed for analyzing the panel data models in which the dependent variable is influenced by its past values (Mileva, 2007). It is proved by Arellano and Bond (1991) that the consistent estimates of the parameters are provided by GMM by using the instruments obtained from orthogonality conditions that exist between variables' lagged values and the disturbances. Roodman (2009) further supports the use of the difference GMM when there are entity fixed effects in error terms. Flannery and Rangan (2006) , and Chang and Dasgupta (2011) empirically show that empirical studies ignoring the fixed effects are mis-specified because the majority of variation in capital structures is explained by firm specific factors.

Furthermore, Roodman (2009) also supports the use of GMM when the panel data has short time periods (T) and the large number of cross-sections/firms (N). Our panel data comprises of 101 banks and 5 years' data; hence the use of difference GMM is supported. Roodman (2009) also supports the use of the difference GMM when some of the regressors may be endogenous and some explanatory variables may be predetermined and may not be strictly exogenous. To avoid the problems of endogeneity, an instrumental variable approach is used. Other instrumental variable techniques require the determination of external instruments to be used. However, GMM uses the lagged values of the explanatory variables as the instruments. Difference GMM avoids the problems of entity fixed effects and serial correlation in panel data by taking the differenced form of the model. Many recent studies of the dynamic capital structure such as Drobetz and Wanzenried (2007),

Mukherjee and Mahakud (2010), and Haron (2014) use difference GMM as the estimation technique. Flannery and Hankins (2013), report that out of the established estimation techniques of dynamic panel model the GMM appears to perform better

One concern is the reverse feedback from OBSA on our independent variables and more precisely that arises from the credit and liability risks measures, thus these regressors in the FE models may be correlated with the error term (Nisar et al., 2018). Regarding the issue of endogeneity and within the FE models, we regress the dependent variable OBSA over deeper lagged explanatory variables (Nisar et al., 2018). Such strategy will reduce possible reverse back effects because future values cannot affect past value, as well it reduces the effect of outliers on our results (Hassan & Mahabir, 2018). Another remedy is to use instrumental variables (IV) method. These methods address the potential endogeneity problem of OBSA, credit risk and liquidity risk.

Given the nature of our panel dataset that incorporates short time horizon and a larger country dimensions, therefore we have decided to follow (Hidhiir, 2014) and use the Arellano – Bond (1991) difference GMM estimator first proposed by Holtz-Eakin, Newey and Rosen (1988). This method uses the Generalized Method of Moments (GMM) context to estimate the first difference of the dependent variable as a function of the differenced lag of the dependent variable and the lag of the variables on the right-hand side suspected to be endogenous. Having a dynamic specification of our model beside the conventional static FE models is useful to

account for the autocorrelation that arises from using the lagged dependent variable at the right-hand side. The dynamic model is specified as follows:

$$y_{it} = \alpha_1 y_{it-1} + \alpha_2 x_{it} + \alpha_3 w_{it} + \varepsilon_{i,t} \dots \dots \dots (3.33)$$

$$\varepsilon_{i,t} = U_i + V_{i,t} \dots \dots \dots (3.34)$$

Whereas, y_{it-1} is one period lagged OBSA, x_{it} includes strictly exogenous regressors, w_{it} include endogenous regressors (credit and liquidity risk measures), all of which may be correlated with U_i , the unobserved individual effect. First-differencing the equation removes the U_i and the associated omitted-variable bias.

Following the general to specific approach, beside the aggregate model 3.6, we also report GMM specific models for each of the independent variable's groups, bank specific, regulatory and macroeconomic measures. The difference GMM estimator in all the models uses one period lags of the endogenous variables (Credit and liability risk measures) as instruments. Yet, the selected lags should be correlated with the endogenous variables (relevance condition) and orthogonal to the error term (validity condition).

$$OBSA_{it} = \alpha_0 OBSA_{it-1} + \alpha_1 CAP_{it} + \alpha_2 SIZE_{it} + \alpha_3 LOAN_{it} + \alpha_4 PROF_{it} + \alpha_5 FEE_{it} + \alpha_6 MP_{it} + \alpha_7 CRISK_{it} + \alpha_8 LRISK_{it} + \alpha_9 RR_{it} + \alpha_{10} CAR_{it} + \alpha_{11} RGDP_{it} + \alpha_{12} ISPREAD_{it} + \alpha_{13} INF_{it} + \alpha_{14} ER_{it} + \alpha_{15} LEX_{it} + \varepsilon_{i,t} \dots (3.35)$$

$$OBSA_{it} = \alpha_0 OBSA_{it-1} + \alpha_1 CAP_{it} + \alpha_2 SIZE_{it} + \alpha_3 LOAN_{it} + \alpha_4 PROF_{it} + \alpha_5 FEE_{it} + \alpha_6 MP_{it} + \alpha_7 CRISK_{it} + \alpha_8 LRISK_{it} + \varepsilon_{i,t} \dots \dots \dots (3.36)$$

$$OBSA_{it} = \alpha_0 OBSA_{it-1} + \alpha_1 CAR_{it} + \alpha_2 RR_{it} + \varepsilon_{i,t} \dots \dots \dots (3.37)$$

$$OBSA_{it} = \alpha_0 OBSA_{it-1} + \alpha_1 RGDP_{it} + \alpha_2 ISPREAD_{it} + \alpha_3 INF_{it} + \alpha_4 ER_{it} + \alpha_5 LEX_{it} + \varepsilon_{i,t}$$

.....(3.38)

In some models the AR (2) in difference GMM detects the presence of second-order serial correlation. At these cases we re-estimate the models using system GMM. System GMM uses lagged values of explanatory variables (in levels and differences) to instrument the potential endogenous variables. It has been proved that the system GMM estimator performs better than the first differenced GMM estimator in Monte Carlo simulations when variables were highly persistent (Bjorvatn & Farzanegan, 2013).

Roodman (2009) further supports the use of the difference GMM when there are entity fixed effects in error terms. Flannery and Rangan (2006), Lemmon et al. (2008), and Chang and Dasgupta (2011) empirically show that empirical studies ignoring the fixed effects are mis-specified because the majority of variation in capital structures is explained by firm specific factors. Furthermore, Roodman (2009) also supports the use of GMM when the panel data has short time periods (T) and the large number of cross-sections/firms (N). Our panel data comprises of 101 banks and 05 years' data; hence the use of difference GMM is supported.

Roodman (2009) also supports the use of the difference GMM when some of the regressors may be endogenous and some explanatory variables may be predetermined and may not be strictly exogenous. To avoid the problems of endogeneity, an instrumental variable approach is used. Other instrumental variable techniques require the determination of external instruments to be used. However GMM uses the lagged values of the explanatory variables as the instruments. Difference GMM avoids the

problems of entity fixed effects and serial correlation in panel data by taking the differenced form of the model. Many recent studies of the dynamic capital structure such as Drobetz and Wanzenried (2007), Mukherjee and Mahakud (2010), Haron et al. (2013), and Haron (2014) use difference GMM as the estimation technique. Flannery and Hankins (2013), report that out of the established estimation techniques of dynamic panel model the GMM appears to perform better.

3.9.2.1. GMM post estimation tests

Since we are estimating a dynamic model that incorporates endogenous variables, thus this model is strongly believed to contain autoregressive errors' structure. Having signs of autocorrelations means that the used instruments are not valid and the GMM estimator is no longer consistent. We report GMM test of autocorrelation that examines whether the used instruments in the differenced equation are correlated with the error term or not. The test has a null hypothesis of no autocorrelation. Two statistics are reported under this test, the test for AR (1) process in first differences that is expected to reject the null hypothesis since

$$\Delta e_{i,t} = e_{e,t} - e_{i,t-1} \text{ and } \Delta e_{i,t-1} = e_{e,t-1} - e_{i,t-2} \text{ and both have } e_{e,t-1}$$

The second result, which is more important, examines AR (2) in first difference and detects the second-order serial correlation. In general, the rule of thumb in the lag length selection is to keep the number of instruments less than the number of groups and to accept the null hypotheses of the two previously explained post-estimation tests that ensure that the used instruments are valid and exogenous.

If our GMM model is an identified model, meaning that there is only one instrument per each endogenous variable. In this case we cannot test for the over identification restrictions and we do not need to report the Sargan test (Sargan, 1958).

3.10. Persistency of OBSA

One of our research objectives is to test whether OBSA is persistent overtime or not, meaning that do the off-balance sheet activities during the past periods affect the level of these activities in the current period. We address this question by including the lags of the dependent variable at the right-hand side of the GMM equations. Estimating such a dynamic model using the conventional static FE is problematic as having lags of the dependent variables as regressors causes autocorrelation. Accordingly, a different dynamic panel model like GMM estimation methodology is needed to account for the later issue. The significance of the OBSA lags highlights the degree of persistence over time. Our results confirm the existence of persistence in only one period lagged variable, meaning that OBSA in the last year tends to affect OBSA levels in the current year.

The size or power of the coefficient value between the dependent variable (OBSA) and the lag of the dependent variable can show the persistence of OBSA. Different empirical studies have used different techniques to estimate for estimating persistency. Ordinary least square (OLS) and fixed effect regression have been used by Shyam-Sunder and Myers (1991) and Flannery and Rangan (2006) respectively. OLS is likely to be biased as the lagged dependent variable ($OBSA_{it-1}$) is present on the right hand side of both models (3.35, 3.36, 3.37 and 3.38). Since

the OBSA is also the function of the firm fixed effects, u_i , so the lagged dependent variable will be correlated with error term; hence the coefficient of the lagged dependent variable will be overestimated and speed will be underestimated in OLS (Xu, 2007; Drobetz et al., 2007).

Similarly, fixed effect estimation is also biased as it uses the within firm transformation (deviation of the observations from their individual cross section means) to eliminate the effects of the individual cross sections. Xu (2007) states that even though the transformation removes the firm fixed effect, but it gives rise to the correlation between the transformed dependent variable and the transformed error term. Hence, the coefficient of the lagged dependent variable (OBSA), in fixed effect estimation, becomes seriously biased downwards and speed towards target dependent variable will be overestimated (Drobetz et al., 2014).

Given these biases in use of OLS and fixed effect regression, this study, in line with the suggestions of Arellano and Bond (1991), uses the Difference Generalized Method of Moments (GMM) to estimate the dynamic model. Difference GMM estimator is designed for analyzing the panel data models in which the dependent variable is influenced by its past values (Mileva, 2007). It is proved by Arellano and Bond (1991) that the consistent estimates of the parameters are provided by GMM by using the instruments obtained from orthogonality conditions that exist between variables' lagged values and the disturbances. The model of this study represented as equation 3.35, 3.36, 3.37 and 3.38 also contain the lagged dependent variable ($OBSA_{it-1}$) as the explanatory variable. Hence, this study uses

Arellano and Bond (1991) difference GMM to estimate the following dynamic model for estimating the persistency of OBSA .

3.11. Robustness Measures

Our analysis employs various robustness measures to test the sensitivity of the results to the change in the applied methodology. In principle we follow the general to specific approach within both the FE static and GMM dynamic methodologies in order to trace any changes in the estimated coefficients within the different model structures and after changing the set of independent variables. Within the FE static methodology, we use white cross-section clustered errors that are robust to heteroskedasticity and serial correlation.

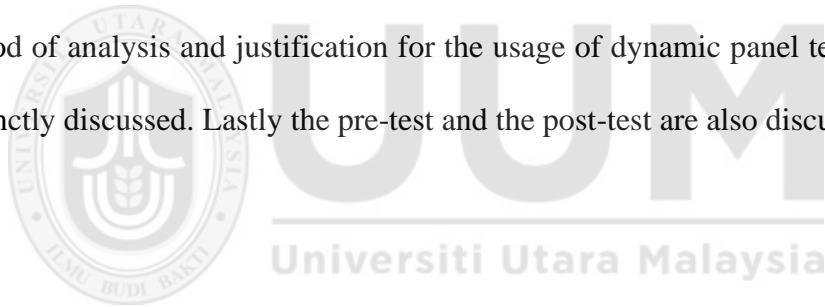
The use of the GMM estimators is justified due to the anticipated overlapping data problem resulting from the variables construction and non-constant variance in the forecast error. This leads to moving average process which prevents the consistency of the usual variance covariance matrix. Thus, will not be efficient in testing hypotheses. The GMM approach replaces unobserved disturbances with observed values and real parameter vector in the orthogonality condition using expected cross multiplication which usually converge to the true parameter vector in terms of the asymptotic distribution. The model also exhibits superiority among the estimators that operate within the orthogonality conditions because it does not suffer the obvious problem of errors in variables (Shabri et al.,2008). Furthermore, the estimates using the GMM technique are robust irrespective of normality in the

distribution of errors or otherwise. Moreover, the approach allows for both conditional heteroscedasticity and serial correlation in orthogonality construction. It further permits the dynamism in considering the distance measure which influences the estimator's asymptotic distribution. The model circumvents the explicit stochastic equilibrium emphasized in the theoretical requirement (Hansen & Singleton, 1982). Also, in some difference- GMM estimations where the instruments are poor and AR2 test shows the existence of serial correlation, we re-estimate these models using system GMM.

3.12. Chapter Summary

This chapter has discussed the research methods and statistical techniques which are envisaged to achieve our research objectives. The first section highlights the methodology proposed to achieve the research objective. The hypothesized relation between dependent and explanatory variables are discussed in section two. The statistical techniques used on econometric models of study are discussed in the last section. The current study is using panel data modeling and to eradicate the confusion and to make the use of selected techniques justifiable we have presented a detailed comparative analysis of available panel data techniques. We have started with static panel data techniques which are pooled OLS, fixed effect, and random effect. After discussing the limitations and advantages, we have discussed the dynamic panel data techniques which are GMM estimator. Finally, we have given a conclusion that why GMM is the most suitable technique in the current study.

This study critically explained the theoretical framework diagrammatically to show the relationship between dependent variables and independent variables. Also, the underpinning theory which relates to off balance sheet activities is reflected on the model specification as shown above. The method of analysis includes static and dynamic panel data analysis. Here research questions one to four are related to research objective one to four as shown, which states the relationship between systematic risk, systematic risk, and regulatory pressure and the OBSA. This is followed by other research questions which tallies with the research objective. The justification of variables used in the work, inclusive source of data collection, method of analysis is spelt out. Also, data collection, the period of the study, method of analysis and justification for the usage of dynamic panel technique are succinctly discussed. Lastly the pre-test and the post-test are also discussed.



CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter discusses the empirical results of the analysis of the relationship between bank-specific factors and OBSA, between regulatory changes and OBSA and between macroeconomic factors and OBSA.

The data is pooled together to have panel data where all firm specific, industry, and country variables are considered. Asteriou and Hall (2007) describe that pooled data can provide much better estimates and the problem of omitted variables can be avoided if the data is pooled. Initially the descriptive statistics is used to analyze the variables and make comparisons. In descriptive analysis the mean, minimum, maximum, and standard deviation of all variables of the sample are calculated. After the descriptive statistics, the model is estimated for pooled data to estimate the persistency and to understand the factors influencing the OBSA using difference GMM.

Models are estimated using fixed effect time and country and difference Generalized Method of Moments (GMM) to account for the heteroskedasticity and serial correlation of residuals. Additionally, Pearson correlation coefficients for all possible pairs of the variables are also estimated and reported in correlation matrix form to understand how the variables affect each other. This matrix also helps us to understand the issue of collinearity between independent variables by analyzing the relationship between

independent variables. To further ensure the nonexistence of multicollinearity in the data, variance inflating factor (VIF) is also calculated.

4.1. Descriptive Statistics

This section has described the summary statistics of the variables used in the current study. We produce detailed descriptive statistics for the entire variables. The variables are estimated in their in transformed versions to reduce the effect of outliers and ensure that possible existing non-linear relations into linear ones (Gujarati, 2004). The summary statistics indicate the fact that the on-average 37 percent of South Asian banks assets are in OBSA. The average capital ratio is 7.3 percent. 4.0 percent of South Asian banks assets are pledged in non-performing loan. The return on asset is 1.8 percent. Fee-based income is 9.11 percent of the total revenue. The average of Capital adequacy ratio is 14.36 percent

Table 4.1
Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
<i>OBSA</i>	473	0.3769211	0.257062	0.0063327	1.7988130
<i>CAP</i>	473	.0738539	.0430503	0.0023131	0.6195135
<i>SIZE</i>	473	20.53497	2.433262	16.504353	27.8464
<i>PROF</i>	473	0.0185505	0.0186968	-0.0413331	0.1121318
<i>MP</i>	473	0.6753433	2.5866600	0.0005322	24.369740
<i>CR</i>	473	0.0403301	0.0630648	0.0145894	0.7429054
<i>LR</i>	473	0.6420857	0.1642445	0.0206659	0.9492560
<i>FEE</i>	473	0.0911335	0.1045013	0.0456170	0.9310000
<i>RR</i>	473	0.0291833	0.0266189	0.0016638	0.1465053
<i>CAR</i>	473	14.373201	6.242420	1.600000	42.860000
<i>RGDP</i>	473	5.512319	1.368280	3.396000	8.1540000
<i>INF</i>	473	4.983173	2.140380	0.350000	8.7500000
<i>ER</i>	473	0.0393395	0.0443643	-.0459304	0.1352254
<i>LEX</i>	473	0.4072516	0.0942727	0.250000	0.6600000
<i>ISPREAD</i>	473	3.155222	1.064166	0.590000	4.810000

4.2. Unit Root test

We start our analysis by testing the stationary of our variables. To make sure that our variables are stationary and avoid any spurious regressions we run panel Fisher type unit root test using Philipps perron method on all our variables. Results support that the variables are stationary at levels (Choi 2001). We use Fisher-type unit root test that applies Augmented Ducky Fuller (ADF) test on each of the cross-sections and reports combined p-values from the panel-specific unit-root tests using the four methods as proposed by Choi (2001).

Table 4.2
Fisher-type panel unit root tests at the level

Variable	P-value
<i>CAP</i>	0.000
<i>SIZE</i>	0.000
<i>PROF</i>	0.000
<i>FEE</i>	0.000
<i>MP</i>	0.000
<i>CR</i>	0.000
<i>LR</i>	0.000
<i>RR</i>	0.000
<i>CAR</i>	0.000
<i>OBSA</i>	0.000
<i>RGDP</i>	0.000
<i>INF</i>	0.000
<i>ER</i>	0.000
<i>LEX</i>	0.000
<i>ISPREAD</i>	0.000

Three of the methods imply using the transformation of p-values by inverse χ^2 , inverse-normal, or inverse-logit, While the fourth is the modification of the inverse χ^2 transformation that is usually used when N tends to infinity. The null hypothesis of the test is that all panels contain a unit root. Table 4.2 reports the fisher-type unit root tests

of the aggregate equation that combines all the variables. The results imply a rejection of the null hypothesis and confirm the stationarity of the variables at levels.

Test's null hypothesis is that all panels contain a unit root. We test different lag lengths in the test specification; however, the significant results have not changed.

4.3. Correlation Coefficient

Table 4.2 presents the Pearson correlation coefficients to measure the strength of relationships between the independent variables in this study. Table 4.5 shows that none of the correlation coefficients between the independent variables are higher than 0.80. We use the benchmark of 0.8 level of correlation as detection for the existence of multicollinearity as suggested by (Gujarati & Porter, 2009). The correlation matrix reports no signs of multicollinearity within any of the variable. We run Pearson's correlation matrix for all the variables to detected collinearly that exceeds 80%. We have found only 2 variables to be highly collinear loan ratio and liquidity. We have dropped loan ratio from our variables list to avoid any model's misspecification (Gujarati and Porter, 2009).

Table 4.3.
Pearson's correlation matrix

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<i>CAP</i>	1														
<i>SIZE</i>	0.1361	1.00													
<i>LOAN</i>	-0.1090	0.3088	1.00												
<i>PROF</i>	0.1569	0.0104	-0.4533	1.00											
<i>MP</i>	0.0139	0.2107	0.2195	-0.1154	1.00										
<i>CR</i>	0.0425	-0.2254	-0.0501	-0.0552	-0.1007	1.00									
<i>LR</i>	0.1043	0.4154	0.8120	-0.3091	0.2643	-0.1191	1.00								
<i>RR</i>	0.1668	0.2305	0.1793	-0.0247	0.4181	-0.1009	0.2714	1.00							
<i>CAR</i>	0.3935	-0.1411	-0.5783	0.6582	-0.0537	0.1482	-0.3682	-0.0179	1.00						
<i>RGDP</i>	0.0686	-0.1560	-0.0412	0.0181	0.2783	-0.0848	0.0325	0.4126	0.1431	1.00					
<i>INF</i>	-0.1117	0.1172	0.0280	-0.0846	-0.1574	-0.0975	-0.0400	-0.2554	0.1301	-0.6649	1.00				
<i>ER</i>	0.1325	0.3069	0.1295	0.0797	0.1309	-0.1603	0.2413	0.2464	0.0257	0.3043	-0.2616	1.00			
<i>LEX</i>	0.2638	0.3444	0.1208	0.0350	0.0982	-0.1171	0.2379	0.1754	-0.0262	0.0437	0.0924	0.3149	1.00		
<i>FEE</i>	0.0104	0.1136	0.0902	0.1507	-0.0997	0.0470	0.0855	-0.0263	-0.0051	-0.1024	0.0680	-0.0465	-0.0145	1.00	
<i>ISPREAD</i>	-0.1767	-0.2862	-0.0930	-0.0158	0.0384	0.0643	-0.1389	0.0303	0.0626	-0.2298	-0.2914	-0.0705	-0.7640	-0.0515	1.00

4.4. Regression Results

This section highlights the regression results of econometric models 3.22, 3.23, 3.24, 3.25. Based on the objectives of the study, the panel data estimated, namely the fixed-effect model, random effect model, and difference GMM are employed to achieve the research objectives and research questions. GMM. However, before running a regression model, we have conducted the series of diagnostic tests namely, variance inflation factor, Breusch, and pagan test/ autocorrelation test, White Heteroscedasticity test Hausman test, Hausman test for cross sectional dependence, and Arrelano-Bond Test. The regression results are presented in the following subsections

4.4.1. Regression results of the aggregate model

Apart from correlation analysis, the current study has employed the variance inflation factor (VIF) to detect multicollinearity in aggregate model. The results of the VIF are shown in table 4.2. The VIF values are below than the threshold values of 5 (Gujrati & porter, p340).

For the selection of most appropriate estimates, we have used several diagnostic tests (see table 4.5.). Firstly, the White Heteroscedasticity test is used to capture the heteroscedasticity issues in our aggregate model. The results of the test indicate that in our aggregate model the null hypothesis is rejected at the 5 percent significance level where p-value is between 0.0000 and 0.0020. Thus, it indicates that there is a problem of heteroscedasticity in aggregate pooled model and recommend the use of random effect estimates.

Table 4.4
Results of variance inflation factor (VIF) of the aggregate model

Variable	P-value
<i>CAP</i>	1.29
<i>SIZE</i>	1.60
<i>PROF</i>	1.21
<i>FEE</i>	1.13
<i>MP</i>	1.56
<i>CR</i>	1.23
<i>LR</i>	1.23
<i>RR</i>	1.60
<i>CAR</i>	1.30
<i>RGDP</i>	1.50
<i>INF</i>	1.24
<i>ER</i>	1.24
<i>LEX</i>	1.76
<i>ISPREAD</i>	1.69

The Breusch Pagan LM test is used to decide between the pooled OLS and Random effects estimations (Breusch–Pagan, 1979). The test examines if the pooled OLS method yields a BLUE estimator that is free from autocorrelation, meaning that the cross-sections specific term equals zero. LM uses Chi square distribution with one degree of freedom under the null hypothesis. When the calculated value exceeds the tabulated chi-square then we reject the null hypothesis and we conclude that the cross-section individual effects are present and consequently the random effects model is the preferred methodology. LM test results in Table (4.5.) that have postulated that the random effects model is preferred over the pooled OLS. The next step is to choose between the fixed and random effects model. In this regard, Hausman specification test is used to compare between the fixed effect estimator μ^1 and random effect estimator μ^2 (Hausman, 1978). The null hypothesis is that the estimator μ^2 is an efficient and unbiased estimator of the true parameters. If this is the case, there should be no systematic difference between the two estimators. The

results in Table 4.5. imply the rejection of the null hypothesis and that the fixed effects model is favored. Arellano-Bond test for zero autocorrelation are estimated in the GMM analysis of the work and they are reflected in following table. We test for cross sectional dependence after each model using pearson test. The test results show that cross sectional dependence exists between the cross sections. With balanced panel data sets we can use Feasible Generalised Least Squares (FGLS) and the Panel Corrected Standard Error (PCSE). But since our panel data set are unbalanced, we use the robust and clustering option after every model. We cluster data across banks (De Hoyos and Sarafidis, 2006).

Table 4.5.
Various test to determine the most appropriate panel data estimates for aggregate model

Statistics	Prob>chi2 Prob>z
Breusch and pagan test/ autocorrelation test	0.0000
White Heteroscedasticity test	0.0000***
Hausman test	0.0003**
Arrelano-Bond Test	0.210
Pesaran	0.0000

If our GMM model is an identified model, meaning that there is only one instrument per each endogenous variable. In this case, we cannot test for the over-identification restrictions. As, our model is an identified model and incorporates only one instrument for each of the endogenous variables. Accordingly, diagnostic tests are reported post the GMM estimation that defines the validity of these instruments it is autocorrelation tests (Arrelano-Bond Test). Similarly, the results of the Arrelano-Bond Test rejecting the presence of autocorrelation. Thus, fixed effect and GMM estimates are appeared to be the most appropriate estimates for the aggregate model.

The results of the fixed estimates for our study are shown in table 4.6. Considering the banks and countries heterogeneities while estimating each one of the predetermined set of equations allows us to accurately identify the econometric effects of each set of the independent variables on OBSA, the aggregate econometric model is estimated in one structures that contains both country and time fixed effects to further account for financial shocks and other time-related events that have affected each one of the four countries .

From the findings, it is evident that the us-systematic risk and systematic risk plays a key role in determining the engagement of South Asian in OBSA. Whereas, regulatory pressure also explains the bank's engagement in OBSA.

The results of Difference GMM are shown in table 4.6. Overall the findings of the study have provided support to the market power theory, and the regulatory and tax theory. The size and fee-based income are in positive and significant relationship with the OBSA. Whereas the bank risk in the shape of the credit risk and liquidity risk is negative significant relationship with the OBSA. The Arrelano-Bond test has confirmed GMM as an appropriate estimate

The credit risk, which is measured as the percentage of nonperforming loans to total asset appeared in a negative relationship in all three measures. Whereas this negative effect is significant in the estimates that contain both country and time fixed effects to further account for financial shocks and other time-related events that have affected each one of the four countries.

Table 4.6.
The Fixed effects panel regression output of the aggregate model

		Fixed Effect (time and country fixed)
		OBSA
Bank Specific Factors		
<i>LR</i>		-00037 (-0.00)
<i>CR</i>		-0.0144* (-2.03)
<i>MP</i>		-0.0997 (-1.10)
<i>CAP</i>		0.0742 (-1.29)
<i>PROF</i>		0.617 (-0.61)
<i>SIZE</i>		0.906** (2.22)
<i>FEE</i>		0.040 (-1.00)
Bank Specific Regulatory Factors		
<i>CAR</i>		0.030 (0.04)
<i>RR</i>		0.196*** (-2.24)
Macroeconomic Factors		
<i>RGDP</i>		0.13952 (-1.10)
<i>INF</i>		0.0080 (-0.15)
<i>ER</i>		0.065*** (2.94)
<i>LEX</i>		0.300*** (2.51)
<i>ISPREAD</i>		-0.034 (0.93)
R-Square		0.20

t statistics in parentheses="* p<0.10, ** p<0.05, and *** p<0.01"

Table 4.7.

The Difference GMM panel regression output of the aggregate model

Difference GMM estimator	
OBSA	
$OBSA_{t-1}$	-0.0656* (-1.840)
Bank Specific Factors	
LR	-0.2060 (-1.12)
CR	-0.1127*** (-3.03)
MP	-0.0509 (-0.75)
CAP	-0.0757 (-1.42)
$PROF$	0.0622 (-0.21)
$SIZE$	3.939*** (-3.33)
FEE	0.2300** (-2.01)
Bank Specific Regulatory Factors	
CAR	0.00198 (-0.74)
RR	0.14300* (-1.85)
Macroeconomic Factors	
$RGDP$	-0.133 (-0.99)
INF	0.0420 (-0.69)
ER	0.0170** (-2.00)
LEX	0.172* (-2.03)
$ISPREAD$	-0.0228 (-1.52)

t statistics in parentheses="* p<0.10, ** p<0.05, and *** p<0.01"

Which indicates that the within-country variations have a significant effect on the credit risk and its impact on the OBSA. The findings are in line with the earlier findings of Ahmad and Hassan (2009) Elian (2012), Ahamd et al. (2012), Nisar et al. (2018), and Perera et al. (2014) The negative relationship between credit risk and OBSA is also in line with the proposition of market power theory , which argues that if the net of loans written off are increasing than increasing total loans will be more risk and offer less incentives for engaging in OBSA. The findings show that that the change in the credit risk, bring 1.44 percent change in the negative change in OBSA. Whereas the results of the dynamic model indicate that the one percent change in the credit risk will bring about the 11.27 percent negative change in OBSA. One of the reason banks in South Asia are diverting towards the conventional activities is the credit risk associated with the OBSA. As according to the Ahmed, Asutay, and Wilson (2014), the OBSA has been manifested in the form of highly structured and exotic financial products notably collateralized debt obligation and credit default., which are no more than the Trojan horse and securitization has unique credit risk, which may increase the existing bank risk. The findings of the current study are in line with the study of Ree (2011), who argued that the bank as aftermath of crisis departing from the risky OBSA. The negative relationship is in, line with the market power theory increasing level of the loan will also increase credit risk, and OBSA will be less attractive. This is also supporting the earlier findings and broaching an interesting argument that the South Asian banks try to manage the credit risk through conventional banking channels. Thus, the findings are showing that in South Asian countries, when the credit risk increases, the banks focus more on conventional banking to manage the risk and decrease their engagement in OBSA.

The liquidity risk in south Asian banks, which is higher in the South Asian banking sector is in a negative relationship with the OBSA in all two estimates. The liquidity risk is in negative relationship with the OBSA, which indicates that, because of the increasing liquidity risk, the banks are disengaging with OBSA. The findings of the dynamic model indicate that the one percent increase in the liquidity risk will decrease the OBSA engagement by 20 percent. The findings are in line with the market power theory, which consider OBSA riskier activities and argues that the banks must engage in OBSA if they are successful in managing the liquidity risk (Ahamd & Nisman, 2012; Perera et al., 2014). The findings suggest that the south Asian banks consider the OBSA risky activities that can dry the liquidity. Meanwhile, increasing liquidity risk is forcing the South Asian banks to disengage in from the OBSA, as most of the OBSA are callable in nature and can be called borrower by marking the markets.

The impact of banks capital, which is actually the ratio of Modified equity capital to the total asset of South Asian banks is positive on the OBSA in all two estimates. However, the relationship is not significant. Similar is the case of profitability of South Asian banks, which in all two estimates is in negative but insignificant relationship with the OBSA. The relationship is consistent with the findings of the Nisar et al. (2018),

Fee-based income whose major portion raised from the OBSA is in significant and positive relationship with the OBSA in GMM estimates. The positive sign indicates banks in South Asia decide their engagement in OBSA on the fee-based income of previous years. The GMM results indicate that the one percent change in the fee based income will bring 23 percent positive change in the OBSA The findings are in, line with the market

power theory which argue that fee-based income as of the parameters of success of the OBSA which gives the true measure of risk associated with the OBSA as well as also show their efficiency in mitigating the risk arising from the traditional banking activities (An & Yu, 2018; Liu, Wu, & Lou, 2018).

The bank size is in a positive and significant relationship with the OBSA in all two estimates. The results are in line with the proposition of market power theory which postulates that the larger banks process more market power and creditworthy than smaller banks and can take excessive risk in the shape of OBSA (Clark et al., 2018). Hence it can be argued that the growth in bank assets helps the banks in attaining economies of scale and reduce risk, and consequently bank may engage in OBSA to earn an additional income. It also indicates that an increase in banks size will provide banks the ability to providing extended banking service for a large number of customers. Because banks with big size have highly qualified risk management and specialized staff and are more efficient in providing higher quality services. So that clients who are more likely to engage in OBS activities may not consider the banks with small size as a transaction vehicle since they believe that banks with big size are too big to fail. From this, one can conclude that banks with large size of the country experience more significant increases in OBS activities through economies of scale. The finding was consistent with the findings of Koppenhaver (1989), Avery and Berger (1991), Rogers and Sinkey (1999), De Young and Hunter (2003) , De Young et al. (2004), Hassan (2006) and Ahmed et al (2012) who found that banks' size affects OBS activities positively, which is consistent with the market discipline hypothesis. This implies that more creditworthy and safer bank will be more willing to use OBS activities

In the aggregate model, the bank's specific regulatory factors appeared in positive relationship with OBSA. The findings accept the proposition of regulatory and tax hypothesis that increasing regulatory pressure push the banks to enhance their engagement in OBSA. However, are rejecting the notion of the market discipline theory which argues that OBSA, are riskier and banks only engage when market regulation allows. Thus, in our case it seems that the South Asian banks are not favoring the regulatory restructuring and following the regulatory theory.

In the set of macroeconomic factors, the level of export, and exchange rate are the only variables which have a significant impact on the OBSA of South Asian commercial banks. The exchange rate is in a positive and significant relationship with the OBSA, which indicates that the banks in South Asia hedge the exchange rate through the use of OBSA. The level of export is in significant positive relationship with the off-balance sheet activities. The positive relationship indicates that the increase in export activities will increase the banks engagement in OBSA

The lagged dependent variable of OBSA is significant, which indicates that the loss of observations due to the inclusion of lagged dependent variable has not affected the estimation results in any significant way which provides a good indication of the robustness of results. The significant coefficient indicates that one should take into account the persistency of OBSA while explaining the OBSA in South Asian banks. The results indicate that when Banks face a negative change in OBSA in the previous year than it will continue the current year. Overall the GMM estimate appears as a most robust measure which confirms that the addressing the endogeneity through dynamic model

provides a better explanation about the impact of bank-specific risk, regulatory changes and the macroeconomic factors on the OBSA.

As mentioned in the previous chapters that the study has followed the general to specific approach and also discussed the impact of each set of variables from the three sets, namely, bank-specific factors, bank-specific regulatory factors and macroeconomic factors as a spate econometric model. The results are discussed and explained in the following subsections

4.3.2. Regression Results of Bank Specific Model

This subsection has explained the regression results of the impact of bank-specific factors namely, credit risk, liquidity risk, market power, capital, profitability, loan, size and fee-based income on the OBSA activities in South Asian commercial banks. The results of variance inflation factors are below than 5 and are consistent with the correlation matrix that there is no issue of multicollinearity in the bank-specific model. The results are shown in table 4.8.

Table 4.8.
Results of variance inflation factor (VIF) of Bank Specific Model

Variable	P value
<i>CAP</i>	1.04
<i>SIZE</i>	1.27
<i>PROF</i>	1.12
<i>FEE</i>	1.10
<i>MP</i>	1.10
<i>CR</i>	1.17
<i>LR</i>	1.14

The results of the White Heteroscedasticity test indicate that the null hypothesis is rejected at the 5 percent significance level where p-value is between 0.0000 and 0.0020. Thus, it indicates that there is a problem of heteroscedasticity in aggregate pooled model and recommend the use of random effect estimates. The Breusch Pagan LM test is used to decide between the pooled OLS and Random effects estimations (Breusch–Pagan, 1979). The test examines if the pooled OLS method yields a BLUE estimator that is free from autocorrelation, meaning that the cross-sections specific term equals zero. LM uses Chi square distribution with one degree of freedom under the null hypothesis.

When the calculated value exceeds the tabulated chi-square then we reject the null hypothesis and we conclude that the cross-section individual effects are present and consequently the random effects model is the preferred methodology. Hausman specification test is used to compare between the fixed effect estimator μ^1 and random effect estimator μ^2 (Hausman, 1978). Similarly, the findings of the Arrelano-Bond Test rejecting the presence of autocorrelation. Thus, fixed effect and GMM estimates are appeared to be the most appropriate estimates for aggregate model.

The cross-sectional dependence of the bank specific model is examined using Pearson test. The results confirm the presence of cross-sectional dependence. To deal with the cross-sectional dependence, the robust and clustering options are used in the analysis.

Table 4.9.

Various test to determine the most appropriate panel data estimates for Bank Specific Model

Statistics	Prob>chi2 Prob>z
Breusch and pagan test/ autocorrelation test	0.0000
White Heteroscedasticity test	0.0000***
Hausman test	0.0001**
Arrelano-Bond Test	0.369
Pesaran	0.0000

The fixed effect results of the bank specific model are shown in the table 4.10. In line with the previous model, the two types of fixed effect estimate namely fixed effect time fixed only and fixed effect time and country fixed are used in the study.

Table 4.10.

The Fixed effects panel regression output of Bank Specific Model

Bank Specific Factors	Fixed Effect (time and country fixed) OBSA
	-0.0493
<i>LR</i>	(-0.1900)
<i>CR</i>	-0.106**
	(-2.15)
<i>MP</i>	-0.0514
	(-1.11)
<i>CAP</i>	-0.00776
	(-0.26)
<i>PROF</i>	0.0297
	(-0.700)
<i>SIZE</i>	0.0917***
	(3.15)
<i>FEE</i>	0.109***
	(-2.03)
R-Square	0.40

t statistics in parentheses="* p<0.10, ** p<0.05, and *** p<0.01"

The results of Difference GMM are shown in table 4.11. The bank specific model passed the Arellano-Bond for autocorrelation respectively and this post estimation confirms the absence of auto correlation and the validity of lagged instrument is proved.

Table 4.11.
The Difference GMM panel regression output of Bank Specific Model

Difference GMM estimator

	OBSA
$OBSA_{t-1}$	-0.0772** (-2.59)
LR	-0.184** (-1.75)
CR	-0.0899** (-2.24)
MP	-0.0636 (-0.37)
CAP	-0.0637 (-0.170)
PROF	1.204* (-1.73)
SIZE	0.0522** (-3.08)
FEE	0.00434** (-4.19)

t statistics in parentheses="* p<0.10, ** p<0.05, and *** p<0.01"

The liquidity risk appears as a significant and negative determinant of the OBSA.. Which also in line with the market power theory that when the liquidity risk increases the bank risk increases and banks disengage in OBSA to mitigate this excessive risk from OBSA. Liquidity risk in both estimates appears in negative relationship with the OBSA. In the static panel, where the time and country effects are controlled the liquidity risk is negative but insignificant relationship with the OBSA. The coefficient value of 0.0493, indicates that the one percent change in the liquidity risk will 4.93 percent change in the OBSA.

The results are supporting the market portfolio theory which argues the OBSA as a function of increasing bank risk. In the GMM estimates, the liquidity risk in negative and significant relationship with the OBSA. The coefficient value indicates that, the one percent change in liquidity risk will bring 18.4 percent negative change in the OBSA

The credit risk is in negative relationship with the OBSA. The results are significant when we fix both the time and country effect. The coefficient value indicates that the change in the credit risk will bring 10.6 percent change in the OBSA. The negative sign indicates that, the banks in south Asia only engage in OBSA, when existing risk is low. In the GMM estimates, the findings are consistent with the fixed effect estimates. However, the results of the dynamic model indicate that the change in the credit risk will bring 8.89 percent change in OBSA. The results are confirming the fact that the South Asian banks use OBSA riskier and increase their engagement in OBSA when the bank risk is manageable. The findings are consistent with the earlier finding and providing support to the market power theory.

Market power of the banks in South Asia is in significant but negative relationship with the OBSA. The results are in contradiction to the proposition of market power theory which argues that the banks with more market power will increase their engagement in OBSA. Whereas the results are in consistent with the proposition of the market portfolio theory, which argues that, higher market power is associated with lower bank risk and hence lower level of OBSA. The market power of South Asian banks appears in a significant but negative relationship with the OBSA, which indicates that the one unit change in market power will bring 5.14 percent decrease in the OBSA, if we keep both the time

and country effect fixed. The results are in line with the proposition of market portfolio theory and in contradiction with the market power theory. The findings of the study are in line with the study of Nguyan et al. (2012) found a negative relationship between market power and the OBSA. The findings imply that the banks with lower market power engage more in OBSA.

The profitability banks are in positive relationship with the OBSA in both estimates. The profitability is in positive but significant relationship with the OBSA in GMM estimates and one percent return on asset will bring 120 percent change on the OBSA. The positive linkage between non-traditional activities and profitability is in line with the study of Chiorazzo, Milani, and Salvini (2008) but contradicts the works of Demirgüç-Kunt and Huizinga, (2010) and Hidayat et al. (2012). In their studies about non-traditional activities of Italian banking industry, Chiorazzo et al. (2008) suggests that non-traditional income has positive relation with risk-adjusted returns on equity which therefore, implies that diversification of revenues can improve banks profitability.

The size of bank in South Asia is in positive relationship with the OBSA. The findings indicate that the larger banks possess more market power and creditworthy than smaller banks and can take excessive risk in the shape of OBSA. The positive relationship between fee-based income and the OBSA further confirm the argument according to De Jonghe, Diepstraten, and Schepens, (2015) risk diversification decisions of banks are largely dependent upon its size. Hence it can be argued that the growth in bank assets helps the banks in attaining economies of scale and reduce risk and consequently bank may engage in OBSA to earn an additional income. Thoracically size can drive diversification towards

OBSA. Even though economies of scope mean the commercial banks with greater size have more opportunities for diversification. The magnitude of coefficient is large, which appears to support the findings of the Chiorazzo et al., (2008), who found the positive relationship between size and OBSA. The findings basically suggest that the big sized banks with well diversified portfolios of assets and better risk management have more capability to earn the diversification gains. The south Asian banks asset diversification from the perspective of the economies of scope lowers the average cost and resultantly banks become more efficient and competitive. Thus, in the view of this logic big-sized conventional banks have more advantages that can be expected to earn greater fee based income than small banks.

The fee-based income is in positive and significant relationship with the OBSA. The results are in line with the proposition of the market power theory, which argues banks earning from OBSA as one of the reason of banks engagement in OSBA. The one-unit change in fee-based income and banks assets of south Asian banks will increase the OBSA by 10.9 percent if we fix the time and country effect.

From the findings it is evident that the bank specific risk plays a key role in determining the engagement of South Asian in OBSA. The findings are providing support to the argument broached that the OBSA in south Asian commercial banks are used to hedge the risk from the conventional banking activities.

Furthermore, the lagged dependent variable of OBSA is significant, that indicates the GMM a robust measure in our case as the loss of observation has placed no effect on the estimation of the results. From the significant coefficient one should take into account the

persistence of OBSA while explaining the impact of the bank specific risk on the OBSA in South Asian banks.

4.3.3. Regression Results of Bank Specific Regulatory Model

The results of variance inflation factors are below than 5 and are consistent with the correlation matrix that there is no issue of multicollinearity in the bank specific model.

The results are shown in the table 4.12.

Table 4.12.

Results of variance inflation factor (VIF) of Bank Specific Regulatory Model

Variable	P value
<i>CAR</i>	1.00
<i>RR</i>	1.02

To examine the impact of bank specific regulatory factors on the OBSA of selected south Asian banks the study has undergone a series of pre and post estimates diagnostics namely, the White Heteroscedastic test, Breusch Pagan LM test, Hausman test, Pesaran test of cross-sectional dependence and the Arrelano and bond test. The values of White Heteroscedasticity test lies between 0.0000 to 0.0020, which reject the null hypothesis, Meanwhile, Breusch and Pagan Lagrangian multiplier test recommend to use random effect over pooled OLS. The results of Hausman test direct us to use FEM over REM. Additionally, the cross-sectional dependence of the bank specific model is examined using Pearson test. The results confirm the presence of cross-sectional dependence. To deal with the cross-sectional dependence, the robust and clustering options are used in the analysis. Lastly, the findings (see table 4.13) accepting the findings of the Arrelano-Bond Test rejecting the presence of autocorrelation. Thus, fixed effect and GMM estimates are appeared to be the most appropriate estimates for aggregate model.

Table 4.13.

Various test to determine the most appropriate panel data estimates for Bank Specific Regulatory Model

Statistics	Prob>chi2 Prob>z
Breusch and pagan test/ autocorrelation test	0.0000
White Heteroscedasticity test	0.0000***
Hausman test	0.0001**
Arrelano-Bond Test	0.793
Pesaran	0.0000

t statistics in parentheses="* p<0.10, ** p<0.05, and *** p<0.01"

In the fixed effect estimates, when the time and country effects are kept fixed, the capital adequacy ratio, and the reserve ratio are in positive and significant relationship with the OBSA. The results indicate that the increasing regulatory pressure because of regulatory restructurings are pushing the banks to engage in the OBSA. The results indicate that the one-unit change in the reserve ratio will bring 24.4 percent positive change in the OBSA. Similarly, the one-unit change in the CAR bring the 24.2 percent change in the OBSA. The findings of the study are in line with the findings of the Hassan (2006).

Table 4.14.

The Fixed effects panel regression output of Bank Specific Regulatory Model

Fixed Effect (time and country fixed)	
Bank Specific Factors	OBSA
<i>CAR</i>	0.242** (-1.73)
<i>RR</i>	0.244*** (-5.92)

t statistics in parentheses="* p<0.10, ** p<0.05, and *** p<0.01"

According to Hassan (2006), non-interest-bearing required reserves is a regulatory tax on banks, which motivates banks to use OBSA to generate income since OBSA are free of the reserve requirement. The higher the required reserves, the greater the incentive that banks will engage in OBSA (Hassan 2006). Meanwhile, the findings are in line with the studies of Sinha, (2005), : Elian, (2012), Chen, (2015), Tahat and AbuNqira, (2016) as they examined and claimed the capital requirements as one of the important determinants of OBSA.

According to the regulatory tax hypothesis, tax regulatory and reserve requirements imposed an additional cost which ultimately reduces the banking profit. To avoid the cost and risk arising from tax regulation and capital and reserve requirements banks prefer to engage in OBSA. The cost of meeting capital reserve requirements and holding non-interest-bearing reserves raises the cost of funds for a bank above what nonbank institutions must pay.

Hassan (1991) argued that the amount of OBS items is in direct relation to regulatory and tax cost. He further argued that increasing regulatory and tax pressure offers additional incentives for banks in engaging OBSA. Recently, Mahoney, Crook, Tully, Strafaci (2017) claimed that OBSA such as financial derivatives, which are not regulated prompt the moral hazard behavior. The findings of the GMM estimates confirms the findings of the fixed effect.

Table 4.15.
The Difference GMM panel regression output of Bank Specific Regulatory Model

Difference GMM estimator	
	OBSA
$OBSA_{t-1}$	-0.0673*** (-3.01)
CAR	0.128** (-2.32)
RR	0.177** (-2.58)

t statistics in parentheses="* p<0.10, ** p<0.05, and *** p<0.01"

Securitization allows commercial banks to transform high risk mortgage into the marketable securities. Moreover, the main benefits of this transformation is that it helps the commercial banks in reducing charges on the capital (reserve) imposed by the BASEL III. In this way the banks off loan risky loans from their balance sheet through securitization as it gives commercial banks a greater capacity of advancing loan and lower the regulatory pressure. The negative and significant relationship between lag of OBSA and OBSA conform the persistency of OBSA. The results are in line with the fixed effect models. however, in the dynamic model the capital adequacy appears as a significant determinant of OBSA of South Asian banks. The regulatory restructuring appeared to be more convincing for South Asian banks for deciding the engagement in OBSA. Whereas market discipline is unable to explain the banks engagement in OBSA.

Moreover, the significant value of lagged coefficient is providing support to the notion that the GMM is a robust measure as it basically indicates that the loss of observation during GMM estimation had no effect on the findings. From the significant coefficient

one should take into account the persistency of OBSA while explaining the impact of the bank specific regulatory factors on the OBSA in South Asian banks.

4.3.4. Regression Results of macroeconomic Model

This section highlights the results of macroeconomic model. The results of variance inflation factor are in line with the correlation matrix and no issue of multicollinearity is detected. The results of the White Heteroscedasticity test indicate that the null hypothesis is rejected at the 5 percent significance level where p-value is between 0.0000 and 0.0020. Thus, it indicates that there is a problem of heteroscedasticity in aggregate pooled model and recommend the use of random effect estimates.

4.16.

Results of variance inflation factor (VIF) of macroeconomic Model

Variable	P value
<i>RGDP</i>	1.32
<i>INF</i>	1.22
<i>ER</i>	1.14
<i>LEX</i>	1.68
<i>ISPREAD</i>	1.64

The Breusch Pagan LM test is used to decide between the pooled OLS and Random effects estimations (Breusch–Pagan, 1979). The test examines if the pooled OLS method yields a BLUE estimator that is free from autocorrelation, meaning that the cross-sections specific term equals zero.

4.17.

Various test to determine the most appropriate panel data estimates for macroeconomic Model

Statistics	Prob>chi2 Prob>z
Breusch and pagan test/ autocorrelation test	0.0000
White Heteroscedasticity test	0.0000***
Hausman test	0.0001**
Arrelano-Bond Test	0.112
Pesaran	0.0000

t statistics in parentheses="* p<0.10, ** p<0.05, and *** p<0.01"

LM uses Chi square distribution with one degree of freedom under the null hypothesis. When the calculated value exceeds the tabulated chi-square then we reject the null hypothesis and we conclude that the cross-section individual effects are present and consequently the random effects model is the preferred methodology. Hausman specification test is used to compare between the fixed effect estimator μ^1 and random effect estimator μ^2 (Hausman, 1978). The results in Table 4.17 imply the rejection of the null hypothesis and that the fixed effects model. The findings (see table 4.18) accepting the null hypothesis of Sargan test that in group the instruments are exogenous. Similarly, the findings of the Arrelano-Bond Test rejecting the presence of autocorrelation. Thus, fixed effect and GMM estimates are appeared to be the most appropriate estimates for aggregate model.

The results of fixed effect estimates revealed the fact that the economic growth and volatility in exchange rate, and level of export are in positive and significant relationship with the OBSA in South Asian commercial Banks. While keeping the time effect fixed the economic growth and level of export are the only variables in significant and positive relationship with the OBSA. However, when we fix the time and country effect both than the economic growth is the only variable in the significant relationship with the OBSA.

Table 4.18.

The Fixed effects panel regression output of macroeconomic Model

	Fixed Effect (time and country fixed)
	OBSA
<i>RGDP</i>	0.238* (-1.97)
<i>INFL</i>	0.041 (-0.55)
<i>ER</i>	0.0490* (-2.66)
<i>LEX</i>	0.122* (-2.23)
<i>ISPREAD</i>	-0.0284 (-0.69)

t statistics in parentheses="* p<0.10, ** p<0.05, and *** p<0.01"

The most literatures suggest that Real GDP captures the effects caused by fluctuations in general economic activity. As result the demand for OBS products reacts positively to the business cycle due to transactions motive. Which means higher economic growth may lead to a greater demand for OBS activities. This study found a positive and significant impact of South Asian real GDP on banks off balance sheet activities. The significant impact of the real GDP growth on the OBS usage may indicate that higher real GDP growth does cause an increase in the OBS usage. The positive impact of the real GDP

growth on the OBS usage indicates that the OBS businesses follow the overall economic growth and business cycles.

The level of export appears in significant and positive relationship with the OBSA. The findings suggest that under dynamic condition, the level of export is in significant and positive relationship with the OBSA. Similarly, the volatility in exchange rate is in positive and significant relationship with the OBSA.

Table 4.19.
The Difference GMM panel regression output of macroeconomic Model

		Difference GMM estimator
		OBSA
Macroeconomic Factors	<i>OBSA_{t-1}</i>	-0.0451* (-1.98)
	<i>RGDP</i>	-0.20860*** (-2.84)
	<i>INFL</i>	-0.0569 (-0.88)
	<i>ER</i>	0.0733148*** (1.99)
	<i>LEX</i>	0.060213** (-2.20)
	<i>INSPREAD</i>	-0.2086064 (1.18)

t statistics in parentheses="* p<0.10, ** p<0.05, and *** p<0.01"

Interest rate spread is considered as one of the key macroeconomic factors that can affect the off-balance sheet activities of banks. Banking area literatures indicate that interest rate can have negative or positive impact on off balance sheet activities of banks.

Regarding inflation (INF), the coefficient of inflation was negative not as anticipated and it was not statistically significant, thus, the effect of inflation on South Asian banks off balance sheet activities is not significant. This is may be because high inflation makes financial saving less attractive than saving in real assets which force banks to provide off balance sheet activities to generate fee.

The results of GMM estimates are constant with the findings of the fixed effect estimates. However, in GMM interest rate spread appears in negative significant relationship OBSA.

In addition, the significant value of lagged coefficient is providing support to the notion that the GMM is a robust measure as it basically indicates that the loss of observation during GMM estimation had no effect on the findings. From the significant coefficient one should take into account the persistency of OBSA while explaining the impact of the macroeconomics factors on the OBSA in South Asian banks.

4.4. Differences between the results of Panel data and GMM

As a benchmark case this study carries out panel estimations on both FEM where unobservable country fixed effects and time fixed effects are included. However, a particular issue of concern in estimating the models on FEM is endogeneity bias which may arise from omitted variables, simultaneity or reverse causality in the relationship between institutional quality and human development inclusive of its components. To overcome this, this study used the GMM estimators proposed by Holtz- Eakin *et al.* (1988) and Arellano and Bond (1991) and further developed by Arellano and Bover (1995) and Blundell and Bond (1998). In particular, this study used the system GMM dynamic panel

For the aggregate model, the GMM results are very much similar to panel data results. The size, credit risk, reserve ratio, exchange rate, and level of export are significant determinant of the OBSA are in significant relationship with the same nature of relationship in both of the variables. However, fee-based income is significant in the GMM estimates only. Overall GMM appears as better and more robust estimates than fixed effect estimates.

For the bank specific model, the GMM results of this research are quite similar with panel data results with minor but noticed differences. However, the in the model examining the impact of regulatory changes on the OBSA, the GMM and static panel estimates overall the FE is a better estimate as the OBSA appears persistent over time. Finally, in the case of macroeconomic model, the GMM estimates as significantly robust technique. As except inflation all the macroeconomic factors are significant determinates of the OBSA. Furthermore, the significant coefficient of lagged dependent variable, in all the four model is indicating that the loss of observation during the estimation process placed no effect on the outcome, and GMM is a robust technique in our case.

The observed differences in the results of GMM and panel data methods of analysis may not be unconnected to the fact that GMM is developed to check the limitations of the panel data method of analysis. Although the advantages of panel data is not in doubt as lamented by Baltagi (2008) that panel data give a researcher a large number of points, increasing the degree of freedom and reducing the collinearity among explanatory variables, this leads to improving the efficiency of econometric estimates. Also, the technique of panel data estimation takes heterogeneity into account by following subject- specific variables.

It also allows a researcher to analyze a number of economic questions that cannot be addressed using other methods. Panel data is suited to study the dynamics of change in countries and firms. The advantages of panel data are more glaring when intra-individual dynamics and inter individual differences of cross-sectional or time-series data are blended together. In another instance, Roodman (2009b), Heckman *et al.* (1998) and Hsiao *et al.* (2006) clearly demonstrated panel's data greater capacity in capturing complication of human behavior when evaluating the effectiveness of social programs. Hsiao (2007) believed Panel data equally generates more accurate predictions for individual outcomes through pooling the data rather than generating predictions of individual outcomes using the data on the individual in question.

However, GMM is used to check the limitations and shortcomings of panel data estimation as proposed by Arrelano and Bond (1991), Arrelano and Bover (1995) and Blundell and Bond (1998). According to Bond (2002) and Roodman (2009a), GMM estimator is more efficient than panel data and GMM does not require complete form underlying model for the estimation. According to Wooldridge (2001), GMM works by adding moment's conditions under the assumption that past values of explanatory variables or past values of dependent variable are uncorrelated with the error term.

4.4. Summary

The chapter has discussed the regression results of the current study. The authors have started the analysis of the study with the description of the summary statistics, then the stationarity of variables used in the study is examined using the unit root test. We have employed the Fisher-type unit root test for the purpose of stationarity. The results of the

unit root test have rejected the null hypothesis of the study which claims the panel contain unit root and thus confirms the stationarity of variables at level. We test the lag length specification; however, the significance of the results has not changed.

Furthermore, the Pearson correlation coefficient is used to measure the strength of the relationship between dependent and independent variables. In addition to that, it is also used to trace the multicollinearity. The Pearson correlation coefficients values indicates that the strength of the relationship is above the threshold, and there are no signs of multicollinearity in our panel. In addition to the Pearson correlation coefficients we have also used variance inflation factor (VIF) to trace the multicollinearity in our panel. The values of VIF for each econometric model are discussed in analysis. The results if VIF values are in line with value of Pearson correlation coefficients.

Basing on the research objectives the study has employed two estimates namely, fixed effect (time and country), and GMM (difference). The results of these estimates and their findings are discussed in the current chapter.

CHAPTER FIVE

SUMMARY OF MAJOR FINDINGS, CONCLUSION, AND POLICY IMPLICATIONS

5.1. Summary of Findings

Our analysis employs various robustness measures to test the sensitivity of the results to the changes in the applied methodology. In principle, we follow the general to specific approach within both the FE static and GMM dynamic methodologies in order to trace any changes in the estimated coefficients within the different model structures and after changing the set of independent variables. Within the FE static methodology, we estimated that the structure contains both country- and time-fixed effects to further account for financial shocks and other time related events that have affected each one of the four countries.

The analysis begins with an aggregate model examining the impact of all the three sets of variables on OBSA. However, for the selection of the most appropriate panel data estimates, the study underwent a series of diagnostic tests. Based on the LM test results, our models were estimated using the FE panel methodology to account for the banks' time-invariant unobservable measures that would affect the dependent variable (OBSA), an example for those related to their geography, distance from big business hubs, bank management system, and marketing strategy (Baltagi, 2005). This method also accounts for time-fixed effects which capture global financial stocks that have impacted the banks in our analysis. For testing the robustness of the results and their sensitivity to the changes

in the applied methodology, we used the two-way error component fixed effects model which allows both time and cross section interpretations to vary. The fixed effect estimate appears to be the most appropriate estimate.

Another concern regarding our panel model is the issue of endogeneity particularly between OBSA, credit risk and liquidity ratio as these variables tend to be affected by OBSA (Perera et al., 2014). This two-way directional relationship is not accounted for in the FE models. Endogeneity could also arise from the omitted variables that are captured by the error term. As the sample of the study comprises four Asian countries with unique macroeconomic issues, market mechanisms and regulations so that the unobservable variables are time-invariant, the FE method in our study can address them (Ullah et al., 2018). However, if these factors are time-variant, then one should find an estimation methodology that can control these drivers of simultaneity. We then employed the Generalized Method of Moments (GMM) which is useful in two ways: firstly, it allows us to estimate a dynamic model wherein we include the lagged dependent variable at the right-hand side as the off-balance sheet activities are likely to be affected by activities in the previous period. Also used are the lagged values of explanatory variables (in levels and differences) to instrument the potential endogenous variables (Arellano & Bond, 1991). Thus, the reverse feedback from OBSA on our independent variables and more precisely that arises from the credit and liquidity risks measures; thus, these regressors in the FE models may be correlated with the error term. Also, one of our research objectives is to test whether or not OBSA are persistent overtime i.e. whether the off-balance sheet activities during the past periods affect the level of these activities in the current period. We addressed this question by including the lagged-dependent variable at the right-hand

side. Estimating such a dynamic model using the conventional static FE is problematic as having lags of the dependent variables as regressors causes autocorrelation. Accordingly, a different dynamic panel model estimation methodology such as GMM was needed to account for the later issue.

The **first objective** of the current study is to investigate the impact of risks arising from bank-specific factors such as non-performing loan, poor liquidity, decreasing market power, lowering capital base and profitability, poor loan management, and fee-based income on the OBSA of commercial banks across the four South Asian countries namely Pakistan, Bangladesh, Sri Lanka and India. The results from the aggregate as well as bank-specific models highlighted that the bank-specific risk is a significant determinant of the OBSA of commercial banks across the three South Asian countries. Credit risk appeared as a significant determinant of OBSA, which indicates that the banks in South Asia consider credit risk as one of the most important determinants of OBSA. The negative sign indicates that the banks in South Asia consider the risk from OBSA to be equal or more harmful and that they prefer conventional credit risk than the risk from OBSA. Based on the results, a change in credit risk renders a 1.44 percent negative change in OBSA. South Asian banks are more prone to conventional activities due to the credit risks of OBSA. Ahmed, Asutay and Wilson (2014) indicated that OBSA comes in the form of highly structured and exotic financial products namely collateralized debt obligation and credit defaults that are merely a Trojan horse. Meanwhile, securitization brings with it distinct credit risks that could increase current bank risks. These results are consistent with that of Berger et al. (2019) who highlighted that banks are moving away from OBSA which is deemed as risky following the financial crisis. The finding is also

consistent with the market power theory which states that increased loan levels will lead to increased credit risk thus rendering OBSA to be less appealing. Prior studies have indicated the same results arguing that banks in South Asia resort to traditional banking channels for credit risk management. Hence, in the context of South Asian banks, increased credit risk causes the banks to resort to traditional banking and distance themselves from OBSA. Like credit risk the liquidity risk also appears in negative relationship with the OBSA.

Capital has a positive relationship with OBSA, but the relationship is insignificant. Considering the fact that derivatives trading, and other non-traditional activities are not recorded on balance sheets otherwise called OBSA (Căpraru et al., 2018), these activities can be used to inflate the capital ratios of the banks. Hence, this makes it difficult to assess the level of risk that a bank can bear. Moreover, it might lead to confusion and different interpretations of the regulations amongst the stakeholders in the financial industry. This problem for instance has created conflict between regulatory bodies namely the Federal Reserve and the US Federal Deposits Insurance Corporation (FDIC) particularly in appraising the capital ratio of banks (The Editorial Board, 2015). The inability to estimate the actual capital ratio might overstate the soundness of a bank's financial condition which reflects the regulatory bodies' incapability of measuring the bank's actual risks exposure. As adequate level of equity is extremely important in maintaining the financial stability of a bank, any wrong interpretation on the bank's capital position poses a potential threat to the overall financial system.

Market power has a negative and insignificant relationship with OBSA in all estimates. This implies that because of increasing market competition and decreasing market power, the commercial banks in South Asia are focused more on competing through traditional banking activities. These findings contradict the market power theory which states that banks with higher market power engage more in OBSA. Whereas the results are not consistent with the proposition of the market portfolio theory, which states that more market power leads to lesser bank risks and thus less OBSA engagement. South Asian banks' market power is insignificantly but negatively correlated to OBSA, suggesting that one-unit change in market power produces 0.0514 when time and country effects are included.

Bank size is positively correlated to OBSA, indicating that banks enjoy a safe growth while engaging in OBSA. Based on the findings, large South Asian banks are assumed to be fitter to engage in OBSA. The banks' asset growth facilitates the attainment of economies of scale and reduces risks thus enabling them to engage in OBSA to source for extra income. Larger-sized banks are also more capable of offering further and better banking services for more customers on account of their vastly qualified and efficient risk management and dedicated workforce. Customers that are prone to be involved in OBS activities may disregard small-size banks as a transaction mechanism due to the belief that large-sized banks will never fail. Hence, large-sized banks are assumed to be involved in more OBS activities via the economies of scale, and that with their well-diversified asset portfolios and more efficient risk management are more likely to attain the benefits of diversification. From the standpoint of the economies of scope, the asset diversification of South Asian banks decreases the average cost rendering the banks to be more competent

and competitive. Hence, large-sized banks are more likely to attain higher fee-based income than the smaller-sized banks.

In both estimates, bank profitability is found to be positively correlated to OBSA. In the GMM estimates, bank profitability is positively and significantly correlated to OBSA whereby a one percent asset return will produce a 120 percent OBSA change. This finding is consistent with that of Chiorazzo, Milani and Salvini (2008), but in direct contradiction to that of Demirgüç-Kunt and Huizinga (2010) and Hidayat et al. (2012). Chiorazzo et al. (2008) indicated that non-traditional income in the context of the Italian banking industry is positively correlated to risk-adjusted returns on equity hence implying that revenue diversification can improve profitability.

Fee-based income has a significant and positive relationship with OBSA. This means that South Asia banks engage in OBSA based on the prior year's fee-based income. This is consistent with the market power theory that highlights fee-based income as a measure of OBSA success by giving a true picture of the risks involved and demonstrating the banks' risk mitigation proficiency (An & Yu, 2018; Liu, Wu & Lou, 2018).

The findings of the study had accounted for both of the theoretical models i.e. market portfolio theory and market power theory, which were used to conceptualize the relationship between the bank-specific factors and OBSA. However, the majority of the findings are in line with the market power theory, which indicates that the banks in South Asia consider the risks arising from OBSA and performance as the key determinants of OBSA engagement. The findings indicate that banks in South Asia are using OBSA for arbitrage purposes and only engage in it to enjoy economies of scale and scope in

conventional business. The banking industry in South Asia believes that fee-based income is unable to contribute to its sustainable development. This view is in line with that of DeYoung and Roland (2001), who stated that there are three reasons non-interest income may not contribute to the stability of a bank's income: Firstly, the relationships between borrowers and lenders in lending activities are closer than in fee-based activities. Furthermore, it might be costly for both parties to quit the lending relationship. Meanwhile, OBSA can be more volatile due to competition and lack of information when entering these new activities. Secondly, engaging in OBSA may increase variable costs as banks have to hire more personnel to manage the activities which can increase the banks' operating leverage. Moreover, this also leads to increased earnings volatility. Thirdly, the high fixed-to-variable operating cost ratios and low regulatory capital requirement can increase the degree of total leverage associated with OBSA.

The **second objective** of the current study is to examine the impact of the regulatory restructuring in the form of increased capital adequacy ratio and reserve requirements. The study had employed the capital adequacy ratio and the reserve ratio as the proxies of regulatory pressure. The findings are in line with the arguments broached by the regulatory and tax hypothesis which claims that regulatory pressure arising from the regulatory restructuring after the subprime crisis pushes the banks to increase their engagement in OBSA. Thus, it seems that the banks in South Asia are inclined to follow the market regulatory and tax theory, which claims that increasing regulatory requirement in the form of capital requirement provides banks with incentives to take on the excessive risk of OBSA. The findings are in direct contrast to the proposition of the market discipline theory which basically supports the view that all market players should promote the

transparency risk disclosure, as all the institutions work under the guidelines of the recommended regulatory framework and promote regulated market disciplines. The regulatory and tax theory is more convincing for South Asian banks to engage in OBSA. Meanwhile, market discipline is unable to explain the banks' engagement in OBSA. Actually, securitization allows commercial banks to transform high risk mortgages (or other loans) into marketable securities (Kara et al., 2016). Moreover, the main benefits of this transformation are that commercial banks can reduce their capital charges (reserves) imposed by the Basel Accord and offload risky loans from their balance sheets (Garg, 2017). Furthermore, it gives commercial banks greater capacity for advancing loans (Castellan, 2018).

The **third objective** of the current study is to examine the impact of macroeconomic factors on the OBSA of South Asian banks. The GDP appears to have a significant and positive relationship with OBSA, which indicates that the OBSA engagement of commercial banks is a product of economic activity. The higher the economic growth the greater the demand will be for OBSA. Since real GDP growth significantly affects OBS engagement, it is likely that a higher real GDP growth may increase OBS engagement. When OBS engagement is positively affected by real GDP growth, it means that OBS businesses adhere to the entire economic growth and business cycles. Similarly, export activities which are one of the most important economic activities appear to have a significant and positive relationship with OBSA. The finding provides support to the notion that the economic activities have a significant impact on OBSA. The study also postulated that the volatility in exchange rate is one of the positive and significant determinants. Interestingly, interest rate spread has a negative but significant relationship

with OBSA, which indicates that the South Asian banks only engage in OBSA when the spread ratio is decreasing.

The **fourth and final objective** of the study is to confirm the persistence of OBSA over time i.e. whether or not the off-balance sheet activities during the past periods affect the level of these activities in the current period. We address this question by including the lagged-dependent variable at the right-hand side. Estimating such a dynamic model using the conventional static FE is problematic as having lags of the dependent variables as regressors causes autocorrelation. Accordingly, a different dynamic panel model estimation methodology is needed to account for the later issue. Thus significance of one period lag of difference GMM is used to explain the persistence. The results indicate that the OBSA are persistence over time, which further explains that any change in the bank specific factors, bank specific regulatory factors and macroeconomic factors will bring not only a significant but persistence impact on the OBSA.

5.2. Contributions of the Research

The study has contributed to the existing body of knowledge in several ways.

- Firstly, the study is among the pioneering works on the issue and also among the very few that have conceptualized the impact of systematic risk, regulatory pressure, and bank-specific risk in the context of the market portfolio theory, the market discipline theory, the market power theory and the regulatory and tax theory of banks.

- Secondly, earlier studies on South Asian countries were carried out either on a single country (Ghosh, 2002; Ghosh, 2007), or on a one-dimensional issue such as that of Perera et al. (2014) who examined the link between OBSA and bank lending channel. Whereas the current study had incorporated a comprehensive set of factors affecting OBSA in South Asian commercial banks.
- Thirdly, the study provided support to the market portfolio theory as well as market power theory and argued that bank risk arising from the on-balance sheet activities is the main reason behind the banks' engagement in OBSA. the relationship between the two activities can be explained using Markowitz's modern portfolio theory (1959). The theory basically explains that the correlation amongst the securities (assets) affect the portfolio rate of returns. Moreover, it argues that if securities returns are not correlated, diversification of securities might minimize the risk. According to Garg (2017) the correlation amongst the securities rate of returns contribute to the magnitude of variance of portfolio. Moreover, they suggest that the portfolio of securities can earn minimum variance (risk) if the securities have low positive or negative (imperfectly) correlation. This implies that when the returns of securities move towards a different direction, the loss of investment in certain securities can be cancelled out by the profit from other securities in the portfolio. In the context of the banking industry, the concept of the modern portfolio theory can be used to explain the relationship

between traditional activities and OBSA. The heightened competition in the financial industry was responded with the diversification to OBSA. Besides, this measure has been recommended by stakeholders of the banking industry. It is perceived that OBSA can improve commercial banks' revenue and that it has no positive linkage with traditional activities. Therefore, the present study corroborates the modern portfolio theory that the negative linkage between the traditional activities and OBSA can produce diversification gains. In view of this, should the benefits of diversification outweigh the risk exposure, commercial banks in South Asian countries might engage more in OBSA. The results have provided support to the market power theory which argues that the Banks in South Asia only engage in OBSA when the risk from the conventional activities is decreasing.

- Fourthly, the study argued that increased regulatory pressure as an outcome of regulatory restructuring motivates low risk taking thus rejecting the regulatory and tax theory and supporting the market discipline theory.
- Fifthly, the study had introduced two new factors namely exchange rate and level of export in the existing econometric models capturing the impact of systematic risk on OBSA. The findings of the study confirmed that level of export and volatility in exchange rate are significant positive determinants of OBSA in South Asian banks and provided support to the argument broached in this research.

- Sixth, the study had proven the persistence of OBSA over time. The dynamic panel data was used to trace the persistency.
- Finally, in order to address the methodological limitations of the previous studies, this study used the system GMM estimation technique to estimate the OBSA model and its components. This technique had enabled this study to handle the potential endogeneity problems and to obtain consistent estimates. This study contributes to the existing literature by using these analysis techniques and establishing their reliability and validity in the context of South Asian countries.

5.3. Practical Implication

The findings of the study have several practical implications that can be applied in the context of bank-specific risks, regulatory pressure from regulatory restructuring and risks from systematic factors. These implications are of great importance and will help the policy makers and practitioners in understanding the issues related to OBSA.

5.3.1. Practical Implication for the Bank specific risk

The findings of the study show that the bank-specific risks in South Asian countries are high and are significant determinants of OBSA. The OBSA in South Asian banks are decreasing (see Figure 1.1), where bank-specific risks in the form of credit risk, liquidity risk and other factors are high in the South Asian market. Moreover, the South Asian market is becoming more saturated whilst bank loan ratio is increasing. Meanwhile,

commercial banks in South Asia are successful in managing risks arising from OBSA as the increasing fee-based income poses a significant positive impact on OBSA.

For practitioners, they should practice strict risk assessment on conventional banking lending activities under the continuously changing market environments. In our case, credit risk and loan ratio are increasing, which indicates that banks should practice strict financing risk assessment and open a window for OBSA. Meanwhile, rapid technological changes are also changing the market dynamics and OBSA is emerging as a viable alternative for conventional banking. The marginal benefits of OBSA should be in trade-off with the marginal costs of conventional activities and vice versa. Fee-based income must be considered as an alternate to traditional income because in markets where market size is continuously shrinking, a bank cannot rely solely on conventional activities.

For policymakers, the market structure of South Asian banks needs a restructuring. Although the increasing concentration creates a perfect market competition, it limits their abilities of being innovative.

5.3.2. Practical Implication for the Regulatory restructuring

The continuous rise in regulatory requirements forces banks to put aside substantial allocations from their discretionary budget for compliance purposes and for developing up-to-date systems and processes. Traditional banks are now faced by the challenge of having to constantly assess and improve their operations due to the rapid and escalating changes in the current environment of today's banking and financial industry. The assessment on several sample banks highlighted immense regulatory pressure as their key characteristic. In the context of South Asian banks, high regulatory pressure has been

empirically proven to have a positive effect on OBS activities i.e. it weakens the banks' creditworthiness and demotivates customers from engaging in the OBS activities organized by the banks. Hence, enforced restrictions on capital increase will result in higher OBS activities. This research supports the recent literature and dismisses the regulatory tax hypothesis.

Figures 1.11 and 1.12 highlight that post-subprime crisis, the South Asian financial sector had undergone financial restructuring whilst central banks had increased the capital and reserve requirements. The capital adequacy ratio places increasing regulatory pressure on the banks, whereas the banks are striving for a reserve ratio. The increase in capital adequacy ratio is in line with Basel III. Capital adequacy is an essential regulatory mechanism for guaranteeing financial soundness. Capital requirement in the existing banking system holds two roles. Firstly, it buffers any prospective losses and secondly, it regulates the bank's lending amount in accordance to the central bank's reserve requirements and thus partly regulates the overall economy's money supply extension. Weighting wise, banks that carelessly attempt to give out maximum lending (and thus contribute substantially to the monetary extension) will favorably lend to the lowest risk weighting possible. As such, it is practical to anticipate an evolution to the system to the extent that even with the justified low risk weighting, the increasing lending amount will eventually turn it into high risk.

The second issue entails the capital reserve composition which comes in the form of subordinate debt; this indicates that the debt amount's regulation is partially controlled by the debt thus creating a typical feedback loop. The next issue concerns its role as a buffer

against loan defaults. When a bank has to dip into the leveraged capital reserve as a means to make up for its losses, it will unavoidably cause substantial contraction in the lending without the possibility of recovery. Hence, surplus capitals that are above the limit should be prepared by the bank as a buffer that will not disrupt any regulatory relations. Additional reserve requirements are thus highly pertinent in cases of loan defaults as does a balanced mix between debt and equity.

The marketability of a bank may also benefit from capital adequacy. A well-capitalized bank has better liquidity, lesser risks, enhanced flexibility in dealing with changes in the financial markets and economic conditions, and better regulations. Since the financial crisis, the significance of the regulatory agenda has been indisputable. Unsuccessful banks commonly have poor capital, excessive short-term funding, extreme leverage, and produced high societal risks. Existing reforms have managed to improve the banks' resilience and lower the costs for resolution. Principally, this should not weaken the banks' capability of serving the real economy. As suggested by research, increased bank capital would negatively affect OBSA.

The current findings will be helpful for policymakers in understanding that South Asian banks are following the regulatory theory in terms of raising capital adequacy standards. Nevertheless, the current study also indicates that there should be consistent regulation on both sides. In short, to enable banks to become more prominent in market-based financing, the imposed regulations should support such transition and not overly affect the transacting ability of the banks in capital markets. As noted earlier, an offshoot of the reform agenda is the retreat or reduced participation of banks in some market-making

activities. The banking sector in South Asian countries should develop a system that can trade-off the balance sheet activities and OBSA.

5.3.3. Practical Implication for the Systematic risk

Systematic risk appears as a significant determinant of OBSA. Factors such as economic growth, level of export, volatility in exchange rate and interest rate spread are significant determinants of OBSA.

The current findings will be helpful for policymakers in understanding the impact of changes in economic condition on income diversification and risk diversification activities. OBSAs are largely export-oriented and thus are affected by the volatility in exchange rate. Thus, the factor must be considered while formulating any policies. The interest rate spread in South Asian countries is showing downward trend; under such condition, the study recommended the OBSA as a tool for managing the issue arising from the narrowing interest margins.

5.3.4. Practical Implication for the Persistence of OBSA

The findings of the study have highlighted that the OBSA are persistent over time. The persistence basically explains the dynamic adjustment speed of a dependent variable with respect to independent variable. Therefore, the effect of three set of factors namely the bank specific, bank specific regulator and macroeconomic on the selected south Asia banks will be persistent as the OBSA of these banks have ability to persistently adjust them over the period of time. The findings will be helpful for policymakers, and

researchers in understanding the issue of OBSA as through persistency the impact of different set of factors on the diversification decisions in long run can be accessed.

5.4. Recommendations for The Future Research

The This study is among the pioneering works investigating factors affecting OBSA in South Asian countries. The literature on OBSA is not fairly well-developed and several gaps have been identified as follows:

- The relationship between the efficiency of banks and OBSA has not yet explored. All factors of bank efficiency such as managerial efficiency and cost efficiency must be studied as a separate model using the most robust measures for bank efficiency. To have a clearer picture on the impact of traditional banking activities on OBSA, knowledge about the impact of banking efficiency on OBSA is of great importance.
- This study was carried out on conventional commercial banks in three South Asian countries (as one of the countries does not allow the operations of Islamic banks). Thus, a separate study examining the impact of bank-specific factors, regulatory restructuring, and macroeconomic factors on the OBSA of commercial banks in countries with Islamic banking operations is recommended.
- The impact of bank ownership structure on OBSA is still an unexplored area. Therefore, examining the impact of bank ownership structure on OBSA could be an interesting area for future research. The moral hazard theory explains that the separation of ownership and control

significantly affects a bank's risk taking. Thus, it is recommended for future researchers to examine the direct or intervening role of ownership structure on OBSA.

- The macro-prudential and micro-prudential policies in South Asian countries are in their early stages. The direct and indirect effects of micro-prudential and macro-prudential policies must be examined and offer a unique objective for future researchers.
- The current study had provided support to the notion that some of the factors are endogenous and can be co-determined by OBSA. We used GMM to address the issue; however, another study with advanced statistical measures to address the simultaneity issue of OBSA, credit risk, and liquidity risk is recommended.

5.5. Conclusion

There are more benefits to OBS activities as compared to conventional banking activities that entail collection of deposits and loan extensions. Numerous scholars and policy experts have come up with various theories to explain the reasons why banks engage in OBSA including to generate fee income, to avoid regulatory taxes, to enhance flexibility when faced with challenges, and to manage risks. The findings had provided answers to the questions raised in the study. The findings confirmed the policy implications of the current study and that the banks in South Asia are using OBSA for hedging purposes.

Non-traditional activities that produce non-traditional and other fee-based incomes are deemed to be giving a negative impact to the commercial banks' financial performance.

This view stems from the perception that non-traditional and traditional incomes are correlated. Moreover, the modern portfolio theory suggests that a negative correlation amongst the financial assets will improve portfolio performance. However, in our sample, the findings rejected the proposition as banks in South Asia rely on traditional OBSA. The reactions of South Asian commercial banks towards a number of threats are considered normal under the corridor of corporate strategy. They need to survive in a competitive environment of financial markets. However, unlike other industries, the situation in the banking industry is different whereby the depositors' money is put at stake in this new venture or the so-called non-traditional activities. The terrible consequences of the 2008 global financial crisis can be taken as a hard lesson on how investing depositors' money in risky activities could harm the financial stability of commercial banks and the financial system as a whole. Massive financial institution failures during the global financial crisis had created awareness on the downsides of non-traditional activities and financial innovation. Given the catastrophic impact of the financial crisis, the benefits of non-traditional activities have been questioned by academics, law makers and the public. Moreover, it had sparked skepticisms on the benefits of financial innovation. Undoubtedly, financial innovation was misused by bankers to speculate in high risk financial instruments and unregulated derivatives market. The lesson learned from the global financial crisis suggests that instead of making the financial market more efficient and profitable, financial innovation and non-traditional activities have contributed to a more fragile financial system.

Banks also face competition on both sides of the balance sheets. On the liabilities side, commercial banks which used to monopolize savings and deposit financial services are

being challenged by mutual funds and insurance companies that offer similar services. The higher rate of return on investment in mutual funds attracted more people to place their money under this scheme instead of placing it in commercial bank accounts . In the meantime, on the assets side, finance companies and retail chains are competing with commercial banks in granting loans for both corporate and retail customers. Additionally, telecommunication companies also fueled the heightened competition in the financial market by offering remittance services to consumers who do not have access to banks or other financial institutions.

In the aftermath of the Asian financial crisis, the central bank and governments undertook substantial reforms to strengthen the resilience of the financial industry. New regulations on equity capital forced many banks to get involved in mergers and acquisitions (M&A). This consolidation program substantially reduced the number of commercial banks by half. Given that the economy was in recovery mode, commercial banks had problems in disbursing loans to the business sectors. Although South Asian banks are reluctant to engage in OBSA, commercial banks have to engage in diversification towards non-traditional banking activities so as to avoid increasing regulatory requirements and to survive in the post-crisis period.

Our results have important implications for managers and regulators in the banking industry in South Asia and other developing countries. Banks that are still engaged in only interest-generating activities can initiate non-interest-generating activities to reap the benefits from emerging trends in the industry in order to compete with their peers. Banks that are already engaged in both interest and non-interest income-generating activities can

carefully enhance their non-interest income portfolio into other non-interest income avenues instead of only fees and commission income



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Appendix A: HHI Index calculation

Herfindahl-Hirschman index (HHI) is a measure for market concentration that tests the effect of market structure on performance. Market concentration is measured by the HHI index which is equivalent to the sum of the squares of each bank's market share in total industry assets (see Al-Khouri & Arouri, 2019; Chen & Liao, 2011; Seelanatha, 2010).

The HHI index is calculated using the formula below:

HHI = Sum of the Squared Market Shares of Each Bank Assets

$$HHI = \sum \left(\frac{\text{Bank total Asset}}{\text{Banking Sector Total Assets}} * 100 \right)^2$$

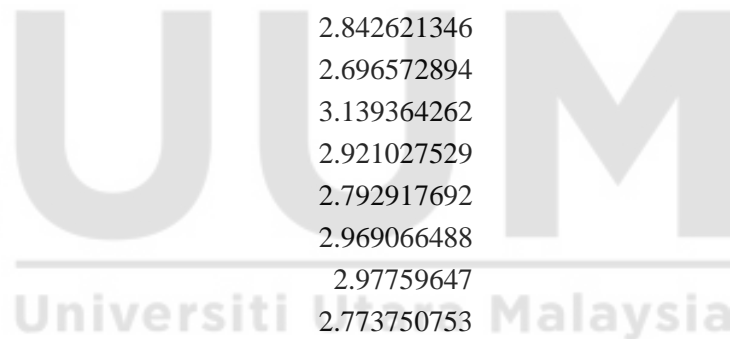
Here we have shown the measurement of HHI index. First of all, we have calculated the banking sector total asset or total assets of all sample banks for each year. In our case of Bangladeshi commercial Banks, the total assets of each year are as follow:

Year	Asset (000)
2013	5029095724532
2014	5892486784699
2015	6787289155118
2016	7112857156340
2017	8509054400726

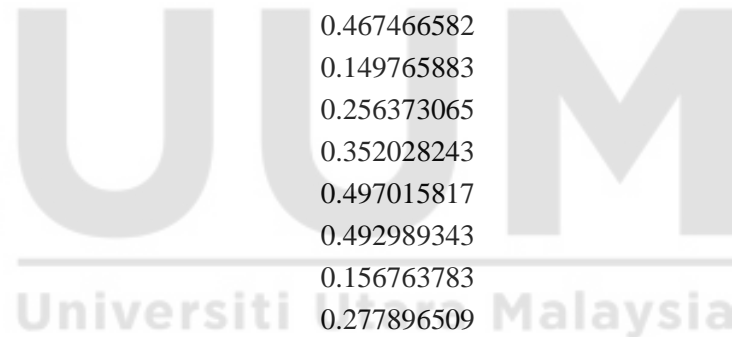
Now to calculate the market power of each bank for each year we will divide the total assets all banks for the year on the total assets of each bank for that year and the results are shown in the table below

Year	Country	ID	Total Assets	Asset of current year	Asset of current year
				$\frac{\text{Total assets of all banks in current year}}{\text{Total assets of all banks in current year}} * 100$	$\left(\frac{\text{Total assets of all banks in current year}}{\text{Total assets of all banks in current year}} * 100\right)^2$
2013	Bangladesh	1	1.63778E+11	3.256604216	10.60547102
2014	Bangladesh	1	1.82731E+11	3.101083584	9.616719392
2015	Bangladesh	1	2.24347E+11	3.305403737	10.92569387
2016	Bangladesh	1	2.53196E+11	3.12091901	9.740135466
2017	Bangladesh	1	2.88997E+11	3.396342639	11.53514332
2013	Bangladesh	2	1.71902E+11	3.418142725	11.68369969
2014	Bangladesh	2	2.04592E+11	3.472085246	12.05537596
2015	Bangladesh	2	2.35024E+11	3.462709283	11.99035558
2016	Bangladesh	2	2.32109E+11	3.263236231	10.6487107
2017	Bangladesh	2	2.89501E+11	3.402274839	11.57547408
2013	Bangladesh	3	1.47472E+11	2.9323685	8.598785022
2014	Bangladesh	3	1.77228E+11	3.007686269	9.046176694
2015	Bangladesh	3	2.1484E+11	3.165334695	10.01934373
2016	Bangladesh	3	2.54776E+11	3.140402361	9.862126988
2017	Bangladesh	3	2.75531E+11	3.238096922	10.48527168
2013	Bangladesh	4	6.07192E+11	12.07358737	145.7715119
2014	Bangladesh	4	7.9561E+11	13.50210292	182.3067832
2015	Bangladesh	4	8.79805E+11	12.96253995	168.0274419
2016	Bangladesh	4	1.0122E+12	12.47650749	155.6632392
2017	Bangladesh	4	1.14337E+12	13.4371425	180.5567985
2013	Bangladesh	5	1.57398E+11	3.129745488	9.795306818
2014	Bangladesh	5	1.72965E+11	2.935343392	8.616240827
2015	Bangladesh	5	1.86179E+11	2.743060559	7.524381233
2016	Bangladesh	5	2.09929E+11	2.587609648	6.695723691
2017	Bangladesh	5	2.48467E+11	2.920032434	8.526589418

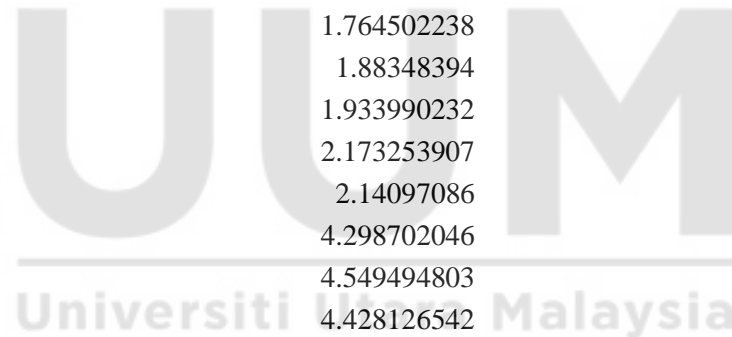
2013	Bangladesh	6	1.85013E+11	3.678861461	13.53402165
2014	Bangladesh	6	2.14499E+11	3.640203552	13.2510819
2015	Bangladesh	6	2.36052E+11	3.477847028	12.09541995
2016	Bangladesh	6	2.66166E+11	3.742038917	14.00285526
2017	Bangladesh	6	3.08623E+11	3.626995324	13.15509508
2013	Bangladesh	7	1.44409E+11	2.871463148	8.245300612
2014	Bangladesh	7	1.58748E+11	2.694067027	7.257997148
2015	Bangladesh	7	1.76362E+11	2.598422848	6.751801295
2016	Bangladesh	7	2.02192E+11	2.842621346	8.080496119
2017	Bangladesh	7	2.29453E+11	2.696572894	7.271505372
2013	Bangladesh	8	1.57882E+11	3.139364262	9.855607967
2014	Bangladesh	8	1.72121E+11	2.921027529	8.532401824
2015	Bangladesh	8	1.89563E+11	2.792917692	7.800389234
2016	Bangladesh	8	2.11185E+11	2.969066488	8.815355809
2017	Bangladesh	8	2.53365E+11	2.97759647	8.866080739
2013	Bangladesh	9	1.39495E+11	2.773750753	7.693693242
2014	Bangladesh	9	1.39895E+11	2.374132186	5.636503638
2015	Bangladesh	9	1.43434E+11	2.113274	4.465926998
2016	Bangladesh	9	1.68418E+11	2.367801	5.606481576
2017	Bangladesh	9	1.97059E+11	2.315868824	5.363248409
2013	Bangladesh	10	5.86083E+11	11.65384431	135.8120871
2014	Bangladesh	10	6.28415E+11	10.66468705	113.7355498
2015	Bangladesh	10	6.83158E+11	10.06524933	101.309244
2016	Bangladesh	10	7.78604E+11	10.94642971	119.8243235
2017	Bangladesh	10	8.05988E+11	9.472126627	89.72118283
2013	Bangladesh	11	1.68474E+11	3.349988587	11.22242353



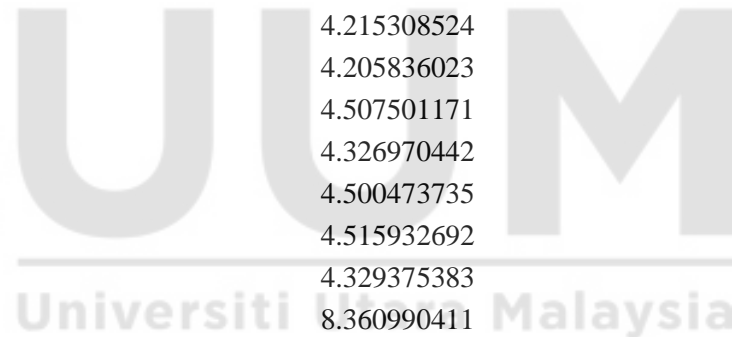
2014	Bangladesh	11	1.68474E+11	2.859134673	8.174651081
2015	Bangladesh	11	1.828E+11	2.693272107	7.253714645
2016	Bangladesh	11	2.04127E+11	2.869837946	8.235969835
2017	Bangladesh	11	2.6017E+11	3.05756567	9.348707828
2013	Bangladesh	12	7208093931	0.143327833	0.020542868
2014	Bangladesh	12	13770314696	0.233692755	0.054612304
2015	Bangladesh	12	22790581709	0.335783274	0.112750407
2016	Bangladesh	12	31841126745	0.447655928	0.20039583
2017	Bangladesh	12	39776985765	0.467466582	0.218525005
2013	Bangladesh	13	7531869630	0.149765883	0.02242982
2014	Bangladesh	13	15106748970	0.256373065	0.065727148
2015	Bangladesh	13	23893174740	0.352028243	0.123923884
2016	Bangladesh	13	35352025103	0.497015817	0.247024722
2017	Bangladesh	13	41948731369	0.492989343	0.243038492
2013	Bangladesh	14	7883800713	0.156763783	0.024574884
2014	Bangladesh	14	16375015081	0.277896509	0.07722647
2015	Bangladesh	14	23765501499	0.350147179	0.122603047
2016	Bangladesh	14	32424511226	0.455857759	0.207806296
2017	Bangladesh	14	45049866867	0.529434468	0.280300856
2013	Bangladesh	15	1.00732E+11	2.002986952	4.011956728
2014	Bangladesh	15	1.15706E+11	1.963616021	3.855787878
2015	Bangladesh	15	1.45577E+11	2.144844323	4.600357171
2016	Bangladesh	15	1.6448E+11	2.312438117	5.347370044
2017	Bangladesh	15	2.01278E+11	2.365451117	5.595358989
2013	Bangladesh	16	5965964191	0.118628965	0.014072831
2014	Bangladesh	16	13491504106	0.228961126	0.052423197



2015	Bangladesh	16	20534622257	0.302545269	0.09153364
2016	Bangladesh	16	24729839315	0.347677997	0.12087999
2017	Bangladesh	16	34940086920	0.410622441	0.168610789
2013	Bangladesh	17	1.02691E+11	2.041937089	4.169507076
2014	Bangladesh	17	1.2182E+11	2.067377405	4.274049333
2015	Bangladesh	17	1.54193E+11	2.271788435	5.161022694
2016	Bangladesh	17	1.88241E+11	2.646492136	7.003920628
2017	Bangladesh	17	2.27202E+11	2.670119182	7.129536448
2013	Bangladesh	18	88738506627	1.764502238	3.113468149
2014	Bangladesh	18	1.10984E+11	1.88348394	3.547511753
2015	Bangladesh	18	1.31266E+11	1.933990232	3.740318218
2016	Bangladesh	18	1.5458E+11	2.173253907	4.723032545
2017	Bangladesh	18	1.82176E+11	2.14097086	4.583756222
2013	Bangladesh	19	2.16186E+11	4.298702046	18.47883928
2014	Bangladesh	19	2.68078E+11	4.549494803	20.69790296
2015	Bangladesh	19	3.0055E+11	4.428126542	19.60830468
2016	Bangladesh	19	3.34108E+11	4.697246817	22.06412766
2017	Bangladesh	19	3.8141E+11	4.482404018	20.09194578
2013	Bangladesh	20	1.08575E+11	2.15893131	4.660984401
2014	Bangladesh	20	1.19052E+11	2.020406536	4.08204257
2015	Bangladesh	20	1.31205E+11	1.933102762	3.736886289
2016	Bangladesh	20	1.51654E+11	2.132109339	4.545890234
2017	Bangladesh	20	1.74135E+11	2.046468314	4.188032561
2013	Bangladesh	21	2.20578E+11	4.3860405	19.23735127
2014	Bangladesh	21	2.36216E+11	4.008768349	16.07022367
2015	Bangladesh	21	2.60253E+11	3.834418075	14.70276197



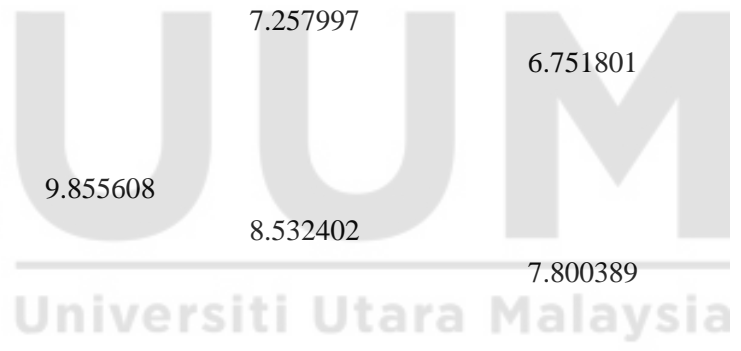
2016	Bangladesh	21	2.91993E+11	4.105143624	16.85220418
2017	Bangladesh	21	3.38909E+11	3.982924884	15.86369063
2013	Bangladesh	22	8.52224E+11	16.94586059	287.1621911
2014	Bangladesh	22	9.34592E+11	15.8607452	251.5632385
2015	Bangladesh	22	1.02611E+12	15.11809034	228.5566554
2016	Bangladesh	22	1.20059E+12	16.87915202	284.9057729
2017	Bangladesh	22	1.24033E+12	14.5766158	212.4777282
2013	Bangladesh	23	2.28534E+11	4.544231868	20.65004327
2014	Bangladesh	23	2.48386E+11	4.215308524	17.76882596
2015	Bangladesh	23	2.85462E+11	4.205836023	17.68905665
2016	Bangladesh	23	3.20612E+11	4.507501171	20.3175668
2017	Bangladesh	23	3.68184E+11	4.326970442	18.72267321
2013	Bangladesh	24	2.26333E+11	4.500473735	20.25426384
2014	Bangladesh	24	2.66101E+11	4.515932692	20.39364808
2015	Bangladesh	24	2.93847E+11	4.329375383	18.74349121
2016	Bangladesh	24	5.94705E+11	8.360990411	69.90616066
2017	Bangladesh	24	6.94705E+11	8.164306774	66.65590509



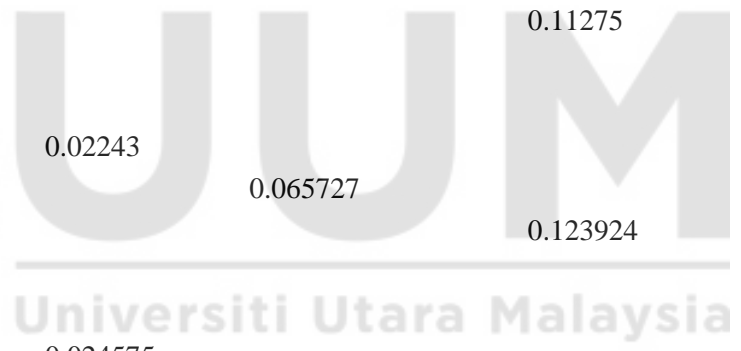
And the HHI index value are measured as follow

Country	ID	2013	2014	2015	2016	2017
Bangladesh	1	10.60547				
Bangladesh	1		9.616719			
Bangladesh	1			10.92569		
Bangladesh	1				9.740135	
Bangladesh	1					11.53514
Bangladesh	2	11.6837				
Bangladesh	2		12.05538			
Bangladesh	2			11.99036		
Bangladesh	2				10.64871	
Bangladesh	2					11.57547
Bangladesh	3	8.598785				
Bangladesh	3		9.046177			
Bangladesh	3			10.01934		
Bangladesh	3				9.862127	
Bangladesh	3					10.48527
Bangladesh	4	145.7715				
Bangladesh	4		182.3068			
Bangladesh	4			168.0274		
Bangladesh	4				155.6632	
Bangladesh	4					180.5568
Bangladesh	5	9.795307				
Bangladesh	5		8.616241			
Bangladesh	5			7.524381		

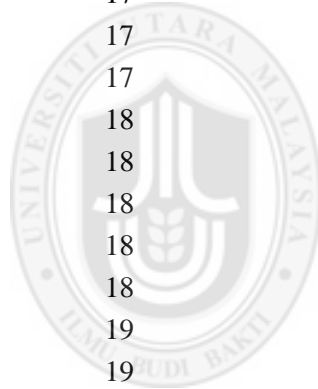
Bangladesh	5				6.695724	
Bangladesh	5					8.526589
Bangladesh	6	13.53402				
Bangladesh	6		13.25108			
Bangladesh	6			12.09542		
Bangladesh	6				14.00286	
Bangladesh	6					13.1551
Bangladesh	7	8.245301				
Bangladesh	7		7.257997			
Bangladesh	7			6.751801		
Bangladesh	7				8.080496	
Bangladesh	7					7.271505
Bangladesh	8	9.855608				
Bangladesh	8		8.532402			
Bangladesh	8			7.800389		
Bangladesh	8				8.815356	
Bangladesh	8					8.866081
Bangladesh	9	7.693693				
Bangladesh	9		5.636504			
Bangladesh	9			4.465927		
Bangladesh	9				5.606482	
Bangladesh	9					5.363248
Bangladesh	10	135.8121				
Bangladesh	10		113.7355			
Bangladesh	10			101.3092		
Bangladesh	10				119.8243	



Bangladesh	10					89.72118
Bangladesh	11	11.22242				
Bangladesh	11		8.174651			
Bangladesh	11			7.253715		
Bangladesh	11				8.23597	
Bangladesh	11					9.348708
Bangladesh	12	0.020543				
Bangladesh	12		0.054612			
Bangladesh	12			0.11275		
Bangladesh	12				0.200396	
Bangladesh	12					0.218525
Bangladesh	13	0.02243				
Bangladesh	13		0.065727			
Bangladesh	13			0.123924		
Bangladesh	13				0.247025	
Bangladesh	13					0.243038
Bangladesh	14	0.024575				
Bangladesh	14		0.077226			
Bangladesh	14			0.122603		
Bangladesh	14				0.207806	
Bangladesh	14					0.280301
Bangladesh	15	4.011957				
Bangladesh	15		3.855788			
Bangladesh	15			4.600357		
Bangladesh	15				5.34737	
Bangladesh	15					5.595359



Bangladesh	16	0.014073				
Bangladesh	16		0.052423			
Bangladesh	16			0.091534		
Bangladesh	16				0.12088	
Bangladesh	16					0.168611
Bangladesh	17	4.169507				
Bangladesh	17		4.274049			
Bangladesh	17			5.161023		
Bangladesh	17				7.003921	
Bangladesh	17					7.129536
Bangladesh	18	3.113468				
Bangladesh	18		3.547512			
Bangladesh	18			3.740318		
Bangladesh	18				4.723033	
Bangladesh	18					4.583756
Bangladesh	19	18.47884				
Bangladesh	19		20.6979			
Bangladesh	19			19.6083		
Bangladesh	19				22.06413	
Bangladesh	19					20.09195
Bangladesh	20	4.660984				
Bangladesh	20		4.082043			
Bangladesh	20			3.736886		
Bangladesh	20				4.54589	
Bangladesh	20					4.188033
Bangladesh	21	19.23735				



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Bangladesh	21		16.07022				
Bangladesh	21				14.70276		
Bangladesh	21					16.8522	
Bangladesh	21						15.86369
Bangladesh	22	287.1622					
Bangladesh	22		251.5632				
Bangladesh	22				228.5567		
Bangladesh	22					284.9058	
Bangladesh	22						212.4777
Bangladesh	23	20.65004					
Bangladesh	23		17.76883				
Bangladesh	23				17.68906		
Bangladesh	23					20.31757	
Bangladesh	23						18.72267
Bangladesh	24	20.25426					
Bangladesh	24		20.39365				
Bangladesh	24				18.74349		
Bangladesh	24					69.90616	
Bangladesh	24						66.65591
$\sum_{1}^{24} \left(\frac{\text{Asset of current year}}{\text{Total assets of all banks in current year}} * 100 \right)^2$		744.0326	720.7327	665.1534	793.6176	712.6242	