



Research Topic

**The Impact of Credit Risk Management and Basel III Accord:  
An Evaluation on Challenges of Trade Finance**

Geneva Business School

Master of Science in International Finance

Submitted by:

**Sophia TEMPEL**

Geneva, Switzerland

Approved on the application of:

**Prof. Seydou SECK**

Date: 18.12.2021

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Student Full Name: Sophia Tempel

Student ID: 17SEP1207MSC

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## ABSTRACT

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Banks have generated latent risks by financing their exponential growth with debt instruments and covered regulatory capital requirements from higher risk-weighted assets with the issuance of hybrid instruments. Combined with other factors, the lack of proper credit risk management has been one of the triggering causes of the worst financial and economic crisis in history. Subsequently, Basel III convention laid out stricter rules not only to further strengthen financial stability but also to prevent such crisis from occurring again like it did in 2008.

From the progressive transition to digital processes through blockchain technologies, which is expected to facilitate about USD 1.1 trillion of new trade volumes globally, to adjusting to a cash-hungry market, a growing number of trade finance funds have emerged to meet the demand of institutional investors looking for alternative returns. With high-yields, low volatility, and low correlation to bonds and stocks, the potential for investment in the trade finance sector could provide solutions not only for banks but also corporations. Such examples include launching a credit fund which would participate in a bank's trade finance transaction through synthetic securitization, allowing investors to invest in trade finance while giving banks more capacity in providing loans.

This thesis examines the credit risk management challenges faced by financial institutions engaged in international trade finance, especially after implementation of the Basel III guidelines. The thesis also ascertains the effect of the Basel III strict capital and liquidity rules on the value of global trade finance. The quantitative empirical outcome indicates that in contrast to prior insight, the adoption of Basel III regulations, which increased the leverage ratio to 4% had a positive effect in raising the value of global trade finance after the year 2014. The thesis acknowledges that the Basel III accord created considerable business growth opportunities for small banks to profit from the global trade finance business. The qualitative insight indicates that the increased cost of trade finance (up to 43%) for large banks due to the high-risk weight of trade finance assets (150%) as well as the high risk associated with trade-based money laundering venture are some of the major challenges faced by banks engaged in trade finance during the Basel III regime. The thesis concludes by offering recommendations to address the stated challenges, including the use of blockchain-based technology payment solutions, setting up trade finance credit fund and provision of credit risk management training.

# CHAPTER 1: INTRODUCTION

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## 1.1 Background

Trade finance signifies an arrangement in which commercial banks or non-bank financial institutions acting as intermediaries intervene to facilitate a domestic or foreign trading transaction between the seller and the buyer. Trade finance plays an efficient role in promoting international trade and has been known to mitigate some of the risks associated with international trade transactions such as buyer/seller default risks (Auboin & Blengini, 2018). The importance of trade finance in international trade is reflected by the insight that during the year 2018, the value of global traded goods and services amounted to \$19.67 trillion (Rehman, Muhammad, Sarwar & Raz, 2019; ICC, 2020). The estimates by the World Trade Organization (WTO) indicate that between 80% to 90% of the global trade depends on the trade finance arrangements.

The post 2007-2008 global financial crisis (after mid-2009) saw the global trade finance market experience considerable challenges because there were fewer financial institutions, especially the large banks who were willing to finance such international trade transactions. One of the central factors that explained the decline in global trade finance was the implementation of the Basel III agreement in 2009, which was based on strict minimum capital requirements, supervisory review process and market discipline (Berrios, 2013). Specifically, the strict capital and liquidity rules posed by the Basel III accord, which was put in place by the Basel Committee on Banking Supervision resulted in considerable increases in the cost of trade finance and subsequently lower profitability in trade finance assets (Musa, 2014). For instance, the insight based on the study by Lasaga (2019) shows that among the banks following the standardized approach, the cost of trade finance increased by 17.1% in 2015 to a 23.3% increase as at 2019. Moreover, the effect of Basel III implementation for large commercial banks relying on the advanced approaches was an increase in the total cost of trade finance by 42.6% during the year 2019.

There are several factors that contributed to the increase in the total cost of trade finance among the commercial banks adopting the standardized and the advanced approach (Chao, Kou, Peng & Alsaadi, 2019). However, the three most important factor aspects that adversely affected the

banks' cost of trade finance related to the higher risk weights, which were applied on trade finance assets and claims on foreign banks, higher capital ratios as well as higher liquidity ratios (Lasaga, 2019). The higher risk-adjusted weights on trade finance assets had a considerable direct effect on the cost of trade finance given that the risk weight of trade finance assets increased from 20% (pre-Basel III) to 150% (post-Basel III). A number of researchers and trade finance analysts have questioned the high-risk weight of the trade finance assets given that the 2007/2008 global financial crisis was mainly attributed to the irresponsible lending in sub-prime mortgages rather than trade finance lending (Fredrick, 2013; Chao et al., 2019). The effect of the high-risk weight of the trade finance is that banks are forced to set aside higher amount of capital reserves to mitigate the risk, which subsequently forces them to raise the interest charged on trade finance. An increase in the cost of trade finance would have a negative effect on the volume of trade finance transactions supported by financial institutions (Auboin & Blengini, 2018).

The other factors that resulted in higher cost of trade finance and therefore, lower volume of trade finance, included the restrictive capital and liquidity rules. For instance, the tier-1 capital ratio for the banks using the standardized approach increased from 4.0% (Pre-Basel III) to 6.0% (Post-Basel III) as shown in Figure 1.1. On the other hand, based on the U.S. Dodd-Frank Act, the banks following the standardized approach were also subjected to a higher capital conservation ratio, which increased from 0.625% (year 2016) to 2.5% (year 2019). Besides, the restrictive liquidity leverage ratios required for banks to adopt under the Basel III guidelines increased from 70% (year 2016) to 100% by the year 2019 (Chao et al., 2019).

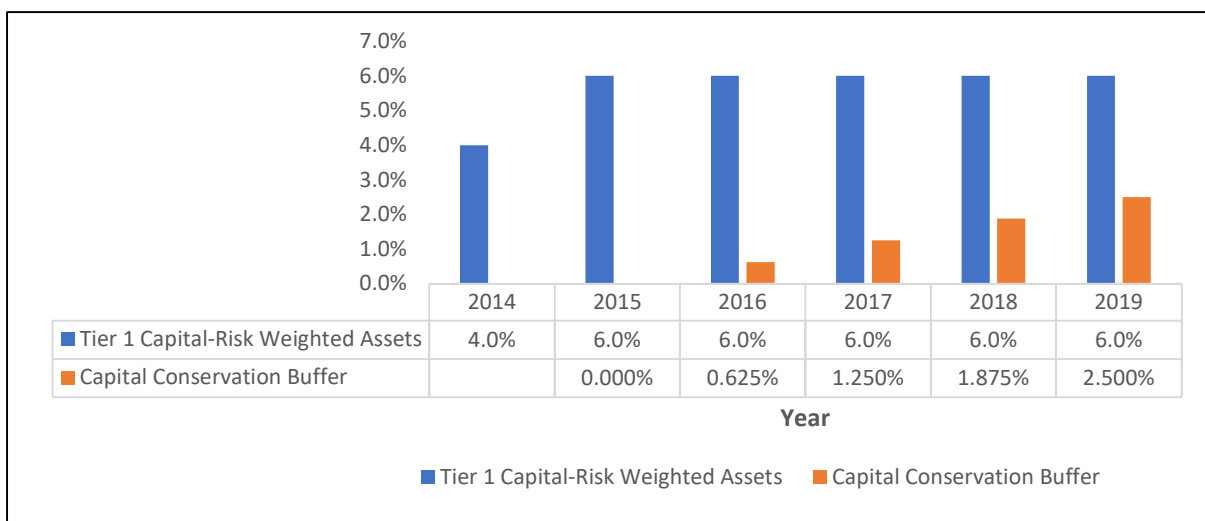


Figure 1.1. Capital Ratios for Standardized Approach Banks: Source: Lasaga (2019)

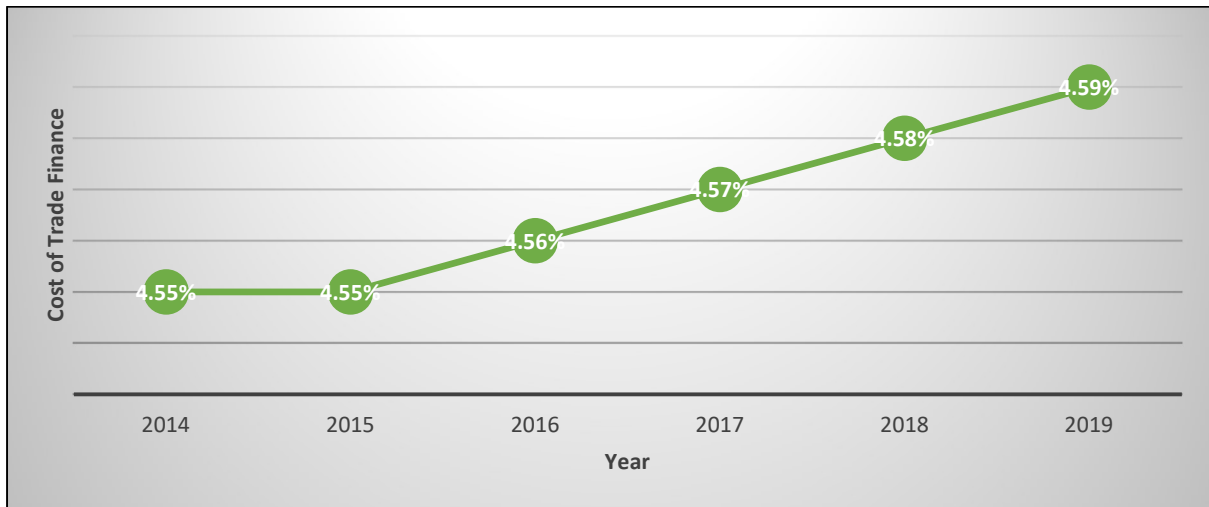


Figure 1.2. Cost of Trade Finance for Standardized Approach Banks: Source: Lasaga (2019)

Besides the increased cost of trade finance as shown in Figure 1.2, the formulation of strict Anti-Money Laundering (AML) and Counter-Terrorism Financing (CTF) legislations has also forced most large banks to reconsider undertaking trade finance arrangements (Lasaga, 2016). For instance, the report by International Finance Corporation (IFC, 2020) indicates that due to the AML/CTF tough regulations, a majority of multinational banks incorporated in developed countries have terminated transactions with corresponding banks in developing nations. The explanation is that some of these developed countries' banks feel that there is a heightened perception of regulatory risk exposure by operating in the stated markets (IFC, 2020). The rise in non-interest expense cost, which is mostly attributed to compliance cost associated with the AML/CTF regulations and the Know Your Customer (KYC) rules has also forced a considerable number of multinational banks to close small accounts, which are associated with greater trade-based money laundering risks.

## 1.2 Statement of the Research Problem

The effect of the strict capital and trading rules on the cost of trade finance is likely to occur in two forms, which include the direct increase in the cost funds and the indirect opportunity cost of banks' decisions to invest in low-yield but less risky assets such High-Quality Liquid Assets (HQLA). The implication is that as a result of the capital and liquidity rules, which require

banks to have less risk exposure in terms of their asset holdings, the majority of the banks fail to take advantage of investing in profitable high-yield assets such as trade finance and investment securities (Li & Peng, 2016). Therefore, one of the credit risk management problem that has affected the banks after implementation of the Basel III accord relates to the fact that the high capital and liquidity ratios have restricted the banks' ability to invest in profitable trade finance assets given that the risk weight of trade finance loans was increased from 20% (Pre-Basel III) to 150% (Post-Basel III).

The implementation of the Basel III guidelines, which came into effect after 2015 in most national jurisdictions has equally been noted to have created substantial opportunities for the regional banks in most developing nations, especially in Asia and Africa (Rehman et al., 2019). Large banks using the advanced approaches seem to have been mostly affected by the implementation of the strict capital and liquidity rules under the Basel III accord. According to the insightful research article by Lasaga (2019), the average cost of trade finance incurred by the large banks increased by 42.6% in 2019 compared to the 23.3% increase in the average cost of trade finance among the small banks using the standardized approach. The implication is that majority of these large banks have been forced to reallocate their capital (funds) from the less profitable trade finance undertaking to other alternative profitable ventures, which have not been adversely affected by the strict Basel III guidelines. The stated situation appears to have paved the way for smaller regional banks to profit from the trade finance business in their respective countries (Chao et al., 2019).

Prior research had mainly focused on the extent to which the tight credit risk management following the implementation of Basel III had affected the banks' leverage and liquidity ratios (Auboin & Blengini 2018; Rehman et al., 2019) as well as the cost of trade finance (Lasaga, 2019). Based on the insight from prior empirical research, there is limited focus on how the banks' credit risk management after the implementation of the Basel III accord affected the volume, value and type of bank assets held by commercial banks. Therefore, this study seeks to address the existing research gap by examining how the implementation of the Basel III accord affected the volume and value of trade finance assets.



### **1.3 Aims, Objectives and Research Questions**

The main aim of the study is to assess the challenges and credit risk management issues faced by commercial banks following the implementation of the Basel III accord, specifically after the year 2014 when most countries had already adopted the guidelines. The specific objective of the study is to assess the extent to which the cost of trade finance and value of global trade finance supported by banks changed after the Basel III accord raised the risk weight of the trade finance assets from 20% to 150% requiring greater capital cushion. Furthermore, as part of the specific objectives for this study, the research project also examines the nature and, or types of trade finance assets and other bank assets that have been held by financial institutions after the Basel III accord implementation.

Therefore, the broad research question and the three specific research questions are specified as follows;

- I. How did the implementation of the Basel III accord influence the cost, volume and value of trade finance transactions facilitated by banks?
- II. What are the challenges and credit risk management issues faced by commercial banks following the implementation of the Basel III accord guidelines?
- III. What are the possible solutions to address the challenges of trade finance and credit risk management issues faced by banks after the implementation of the Basel III accord?

## **1.4 Significance of the Study and Thesis Structure**

The insight from the study is expected to extend the existing empirical knowledge with respect to the effect of the strict capital and liquidity rules on the cost and value of trade finance transactions. The other significant contribution from this study is that the project is expected to highlight the nature and extent of bank asset reallocations following the strict capital and liquidity rules, which raised the cost of trade finance transactions for banks, exporters/importers, and the intermediary traders. Finally, based on the findings from the study, the research provides evidence-based and concrete solutions to address the credit risk management challenges faced by commercial banks after the implementation of the Basel III accord guidelines.

The next chapter of the paper presents a theoretical and empirical literature insight on the effect of the tight credit risk management under the Basel III accord on the cost and value of trade finance facilitated by banks. Chapter three describes how the mixed research design using secondary published data will be applied to facilitate attainment of the stated research aims and objectives. Chapter four presents the results of the statistical regression and inferential analysis as well as thematic insight to answer the three specific research questions. Finally, chapter five presents a summary, conclusion and recommendations for practice and future research.

## CHAPTER 2: Literature Review

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### 2.1 Introduction

The literature review chapter explores the challenges faced by banks following the implementation of the Basel III accord using two main sections, which include the theoretical literature and the empirical literature. In the first subsection of the theoretical literature, a detailed conceptual framework of how the strict credit risk management affected the global trade finance market is described. The nature of the Basel III accord is also described as part of the theoretical literature in this chapter. The second subsection (empirical literature) describes how the strict capital and liquidity regulations have influenced the cost, value and volume of trade finance transactions concluded by the banks.

### 2.2 Theoretical Literature

#### 2.2.1 Conceptual Framework of the Basel III Accord and the Trade Finance Market

A conceptual framework of the Basel III accord and its implication for the trade finance market is summarized in Figure 2.1. The conceptual framework generally depicts the relationship between bank credit risk management under the pre-Basel III and the post-Basel III accord as well as its implication for the trade finance market. The theoretical framework illustrates the adverse effect of the strict capital and liquidity rules, which became applicable after formal implementation of the Basel III accord. According to Lasaga (2019), the pre-Basel III regime was mainly characterized by a low risk weight for trade finance assets and claims on foreign bank reserves, which were fixed at 20% for majority of the non-OECD countries. The low risk profile of the trade finance assets meant that it was much cheaper for both small and large banks to engage in the international trade finance business segment (Rehman et al. 2019). Furthermore, the pre-Basel III period was also characterized by less strict capital and liquidity rules. For instance, during the year 2014 (Pre-Basel III), the tier 1 capital ratio was set at 4% for majority of the jurisdictions, including the non-OECD countries. The liquidity coverage ratio for commercial banks during the pre-Basel II period was less than 60% of the minimum liquidity requirements.

The insight based on the conceptual framework of the Basel III accord and its implication for the international trade finance market also depicts that the post-Basel III regime was mainly characterized by high risk weight allocations for the trade finance assets as well as stringent capital and liquidity rules. Despite the fact that the international trade finance market segment did not contribute to the 2007/2008 global financial crisis, the post-Basel III regulations set the risk weight for trade finance assets at 150%, which was seven times the applicable risk weight during the period before the adoption of the Basel III regulations. The strict capital and liquidity rules under the Basel III regime were also evidenced by the fact that the tier 1 capital ratio was increased to 6% while the liquidity coverage ratio (minimum requirements) were increased from 60% (year 2016) to 100% as at 1<sup>st</sup> January 2019.

The stringent capital and liquidity rules coupled with the high-risk weights for trade finance assets meant that majority of the affected financial institutions, especially the large banks using the advanced approach had to raise the interest cost of trade finance assets (Musa, 2014). For instance, the high tier 1 capital ratio, which increased from 4.5% to 6% and the 150% risk-weight for trade finance assets restricted the amount of bank assets that were set aside for international trade finance assets (Linton, 2019). The implication is that in order to comply with the stringent capital and liquidity regulations, most banks had to raise the applicable interest rates on trade finance assets given their higher risk exposure. According to Lasaga (2019), the small banks that followed the standardized approach experienced a 23.3% increase in the direct cost of trade finance while the large banks adhering to the advanced approaches recorded an average of 42.6% increase in the cost of trade finance. The international banks engaged in trade finance business had to raise the interest cost on trade finance to capture the high risk-weights associated with the trade-based finance assets (Auboin & Blangini, 2018). The stringent capital and liquidity rules, which restricted the capital set aside for trade finance also accounted for the high cost of trade finance after implementation of Basel III accord.

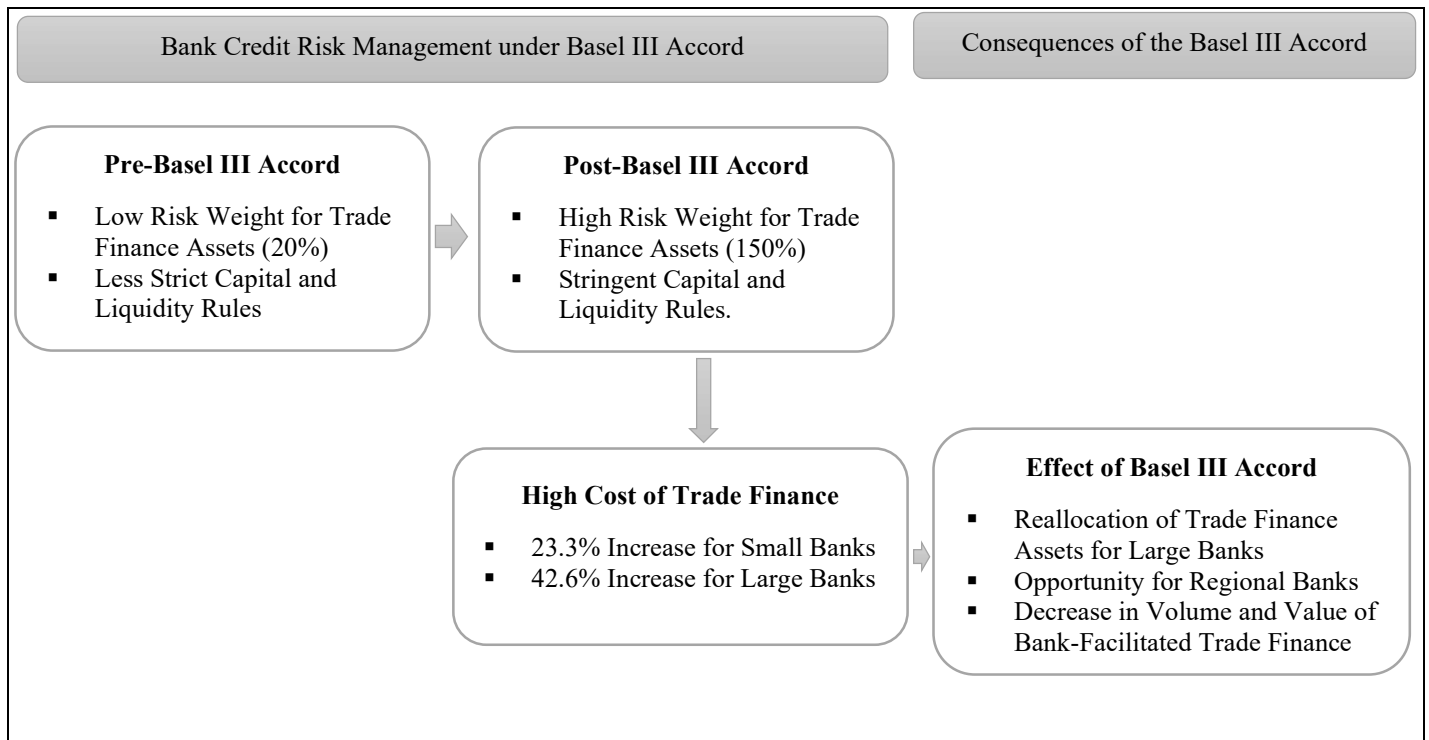


Figure 2.1. Conceptual Framework of the Basel III Accord and Implication for Trade Finance Market

The theoretical conceptual framework of the Basel III accord indicates that there were notable positive and negative implications associated with the adoption of the new capital and liquidity rules (requirements). Firstly, as noted by Rizvi, Kashiramka and Singh (2018), the implementation of Basel III accord resulted in the reallocation of trade finance assets, especially for large commercial banks that were guided by the advanced approaches. The large commercial banks, which were previously engaged in trade finance, had to reallocate their limited capital resources from trade financing to other alternative business ventures with considerably lower risk exposure. The bank asset reallocation strategy was informed by the fact that the large banks following the advanced approaches experienced the highest increase in the cost of trade finance to 42.6% as at end of year 2019. There is an acknowledgement among researchers that the Basel III accord created strategic business opportunities for small banks and the non-bank financial institutions who played a central role in financing international trade (Rizvi et al. 2018; Lasaga, 2019). Specifically, the smaller banks and the non-bank financial institutions, which had a favorable cost of trade finance differential experienced substantial growth in their trade finance business. Finally, as depicted in the theoretical conceptual framework, the high cost of trade finance under the Basel III regime also contributed to a considerable decline in the volume and value of bank-facilitated international trade. According to the World Trade Organization (2020), the annual percentage

change in the global value of trade finance declined from 20% (year 2011) to -3% in the previous year 2019.

### 2.2.2 Global Trade Finance Market

Trade finance is a business segment, which entails the financing of international trade transactions by either commercial banking institutions or non-bank financial institutions (IFC, 2020). In trade finance market, the banking institutions or non-bank institutions act as intermediaries to finance the international trade deals between a buyer (importer) and a seller (exporter). The global trade finance market plays an important role in the growth of international merchandise trade (WTO, 2020). The value of global trade finance was estimated at \$39,714.2 million during the year 2018. The global trade finance market, which has a Compound Annual Growth Rate (CAGR) of 3.79% is expected to reach \$56,065.6 million by the end of year 2026 (IBISWorld, 2020).

The World Trade Organization (WTO) estimates that approximately 80-90% of the global merchandise trade and trade in services is financed by bank credit or insurance credit (WTO, 2020). The implication is that the trade finance market plays a considerable role in the growth of international merchandise trade. For some developing countries in Asia and Africa, a lack of trade finance is a significant factor that hinders the growth of international trade (IFC, 2020). The insight based on the report by IFC (2020) indicate that the SME is the most affected business segment in terms of the challenges it faces in accessing trade finance. The challenges associated with the SMEs is evidenced by the fact that 75% of the unsuccessful trade finance applications over the period, 2010-2018 were attributed to the small and medium scale enterprises.

Despite the growth in international trade and the importance of trade finance, there is considerable gap in unmet demand for international trade finance. The implication is that given the challenges faced by the banks and non-banks institutions, the supply of trade finance is below the demand for international trade finance, especially from the SME sector. The IFC (2020) estimates that the annual excess demand for trade finance is about \$1.5 trillion with almost 50% of the unmet demand attributed to the developing nations in Asia and Africa. This

means that there is substantial opportunity for the global financial sector to invest in the developing countries (Rehman et al., 2019).

The unwillingness of the international banks and the global financial sector in general to invest in trade finance across the developing countries is mainly attributed to the perceived high default risk and the heightened regulatory challenges of operating in the stated regions (IFC, 2020; WTO, 2020). Specifically, the new anti-money laundering (AML) and counter-terrorism financing (CTF) regulations appear to have increased the cost of trade finance and the associated risks in developing countries. As a result, the increased costs attributed to the AML/CTF regulations are associated with the high administrative costs due to the strict Know Your Customer (KYC) and other additional compliance costs.

The international trade finance market has faced considerable challenges, especially since the adoption of the Basel III recommendations (Rehman et al., 2019). The trade finance gap, which is estimated at \$1.5 trillion has mainly been attributed to the stringent credit risk management strategies adopted by the large international banks, which appear to have been adversely affected by the new capital and liquidity rules, which raised the risk-weight of trade finance assets from 20% to 150% (IFC, 2020). The reallocation of asset investments by large banks from trade finance to less risky assets has also contributed to the large trade financing gap. However, in order to address the stated challenges in trade finance, the WTO (2020) has proposed several policy measures, including the mobilization of government-backed export credit agencies as well as the adoption of technical measures to enhance the level of interaction between the public and private entities to promote the supply of trade finance credit. The proposed short-term and medium-term measures are expected to increase the supply of trade finance to facilitate global merchandise trade, which has been adversely affected by the large trade finance deficit (Auboin & Blengini, 2018).

### 2.2.3 The Basel III Capital and Liquidity Rules

The Basel III accord, which was introduced by the Basel Committee on Banking Supervision in 2009 was mainly designed to address the regulatory deficiencies that contributed to the 2007-2008 global financial crisis (Abiola & Olausi, 2014). The Basel III capital and liquidity regulations, which was built on Basel I and II seek to enhance resilience in the banking sector's ability to deal with economic and financial stress (Thieffry, 2011). The other aim of the Basel III accord is to improve credit risk management and enhance transparency in the banking transactions (Musa, 2014).

The stringent capital rules under the Basel III accord are reflected by the fact that the tier 1 capital ratio was raised from 4.5% (pre-Basel III) to 6% (post-Basel III). The implication is that banks and other financial institutions, which were subject to the Basel Committee on Banking Supervision were required to hold a higher proportion of their total capital in the form of equity and reserve capital (Lasaga, 2019). Besides, under the Basel III regulations, commercial banks were required to hold a 2.5% capital conservation buffer to mitigate the financial institutions during periods of economic stress such as the year 2007/2008 global financial crisis (Thieffry, 2011).

## 2.3 Empirical Literature

The empirical study that was conducted by Abiola and Olausi (2016) examined the effect of credit risk management strategies on banks' profitability. The authors acknowledge that effective credit risk management has a dominant role in promoting survival and growth among financial institutions. Using a sample of seven commercial banks from Nigeria in which financial performance data was retrieved over the period from 2005-2011, the study by Abiola and Olausi (2016) found that credit risk management has an important role in enhancing the profitability of banks as measured by the return on assets (ROA) and return on equity (ROE). According to Abiola and Olausi (2016), limited knowledge in credit risk management and regulatory restrictions such as the Basel III accord as well as the KYC compliance regulations have also restricted banks' ability to effectively manage credit risk. The empirical study by Abiola and Olausi (2016) is relevant in highlighting the importance of credit risk management but fails to connect credit risk management with trade finance.



The systematic review insight by Auboin and Blengini (2019) sought to examine the effect of Basel III regulations on trade finance among financial institutions that rely on short-term letters of credit. According to the findings by Auboin and Blengini (2019), the Basel III requirement for banks to maintain a leverage ratio that exceeds 3% reduced the attractiveness of the short-term letters of credits when assessed against other higher risk bank assets. Auboin and Blengini (2019) observe that despite intense lobbying by trade finance private financial institutions in developing countries, the Basel Committee on Banking Supervision managed to formulate the restrictive 100% leverage tax on short-term trade finance assets, which adversely affected the banks' strategic business focus. The insight from this study is relevant in depicting the banks' challenges in terms of how the financial institutions found it hard to effectively manage their trade finance operations following the promulgation of the Basel III guidelines. The research study also highlights that as a result of the 100% leverage tax on letters of credit, banks and other financial institutions involved in trade finance operations switched their investments towards other profitable but highly risky non-trade finance assets (Auboin & Blengini, 2019). However, the study does not describe how the Basel III accord affected the volume and value of other trade finance asset investments by commercial banks.

The empirical study conducted by Berrios (2013) examined the relationship between bank credit risk management, profitability and liquidity. Berrios (2013) observes that one of the main factors that has created a challenge in effective bank credit risk management relates to failure by the financial institutions to adopt prudent lending. On the basis of sample data from Mergent Online database and covariance analytical models, the study finds that there is a negative relationship between less prudent lending and profitability performance in terms of the bank net interest margin and the return on equity. The main strength of the empirical findings by Berrios (2013) is that its insight is relevant in highlighting the importance of prudent lending on bank credit risk management.

The insightful findings by Chao et al. (2019) also highlights some of the challenges faced by banks and other financial institutions after the formulation of the Basel III accord. Specifically, the study explores how efforts by local and international regulators to monitor trade-based money laundering have restricted the ability of commercial banks and other financial institutions to engage in trade finance. In this respect, Chao et al. (2019) contends that intense supervision as well as micro and macro monitoring of entities involved in trade finance have increased the administrative cost of trade finance operations. On the other hand, Chao et al.

(2019) also observe that the monitoring of trade-based money laundering practice can enhance the overall efficiency of financial markets. The findings from this study are unique in expounding how the monitoring of trade-based finance operations has restricted the banks' ability to profit from international trade finance arrangement due to the associated higher administrative costs.

The study by Lasaga (2019) is much relevant in describing the effect of the Basel III regulations on trade finance. Using official published data from WTO and FDIC, it is observed that the Basel III capital and liquidity rules have had both a negative and positive effect on trade finance operations. For instance, the 46% increase in trade finance cost associated with the financial institutions following the advanced banking approaches forced them to switch their strategic business operation from trade finance lending to other non-trade finance bank assets. Basel III regulations appear to have created considerable opportunities for regional banks and other non-bank financial institutions to profit from trade finance operations. The increased cost of trade finance following the formulation of the Basel III regulations is mainly attributed to the fact that the weight of trade finance assets under the new capital and liquidity rules was increased more than 7 times from 20% (Basel II) to 150%. The increased compliance costs as a result of the bank's requirement to adhere to KYC and trade-based anti-money laundering regulations has also been cited as one of the factors that is likely to increase the cost of trade finance. In this regard, the majority of large banks were forced to close small accounts that are considered high risk targets in trade-based money laundering as also explained earlier. Finally, the empirical study by Lasaga (2019) also highlights how the increased leverage ratio from 3% (Pre-Basel III) to 4% (Post-Basel III) as well as the increase in tier-1 capital ratio from 4% (Pre-Basel III) to 6% (Post-Basel III) seem to have adversely affected the attractiveness of the trade finance assets. The insight from the study is mostly effective in highlighting how the new capital and liquidity rules under the Basel III accord have increased the cost of trade finance and therefore, the ability of large banks to engage in trade finance business.

The insight based on the article by Auboin and Behar (2020) explores how the issue of trade financing gap has restricted the extent of global international trade in developing countries. The trade financing gap is estimated to increase from \$1.5 trillion in the year 2020 to \$2.5 trillion by end of the year 2025. It is estimated that 50% of the stated trade financing gap is likely to occur in developing countries compared to the advanced countries, which have a highly structured financial system. Auboin and Behar (2020) observe that the trade financing

gap is likely to be accounted for by the banks' decisions to switch their investments from international trade financing to other profitable business segments, especially after formulation of the restrictive capital and liquidity rules under the Basel III accord. Specifically, higher administrative and compliance costs related to international trade financing can be attributed to the decision by the Basel Committee on Banking Supervision (BCBS) to increase the risk-weight of trade finance assets from 20% to 150%. Therefore, among the banks following the advanced approaches, the cost-to-income ratio of international trade finance is estimated to be 50% to 60%, thereby rendering the international trade financing less attractive (Auboin & Behar, 2020).

## 2.4 Summary of the Empirical Findings and Knowledge Gaps

A summary of the empirical findings and knowledge gaps based on the empirical literature review is presented in Table 2.1 below.

Table 2.1

### *Summary of the Empirical Findings and Knowledge Gaps*

<b>Author</b>	<b>Findings</b>	<b>Knowledge Gaps</b>
Abiola and Olausi (2016)	The study found that effective credit risk management has a positive effect on banks' profitability.	The study fails to highlight how the restrictive capital and liquidity rules under the Basel III accord have affected credit risk management.
Auboin and Blengini (2019)	The Basel III 100% leverage tax associated with the banks' requirement to maintain a leverage ratio in excess of 3% reduced the overall attractiveness of the letters of credits.	The study is relevant in depicting the effect of Basel III regulations on the attractiveness of the short-term letter of credits. However, the study does not assess the effect of the leverage tax on the value and volume of other trade finance asset.
Berrios (2013)	The study found that prudent credit risk management and lending has a significant positive effect on bank profitability.	Based on the study, it is not clear how prudent credit risk management among banks was affected by the Basel III regulation.
Chao et al. (2019)	The intense monitoring of trade-based money laundering has decreased the attractiveness of	The study fails to capture how the challenge of trade-based money laundering

	international trade finance for the banks following the advanced approaches.	was addressed under the Basel III regulation.
Lasaga (2019)	The restrictive capital and liquidity rules under Basel III regulation have created opportunity for regional banks and other non-bank financial institutions to profit from international trade financing. Majority of the regional banks and non-bank financial institutions following the standardised approaches are subjected to less cost of trade finance compared to the large banks.	The insight from the study is much relevant in highlighting the challenges and opportunities faced by banks after the promulgation of the Basel III accord. However, the study fails to provide concrete solution to address the stated challenges of international trade financing.
Auboin and Behar (2020)	The article explains that the high cost of trade finance (50% to 60%) is mostly attributed to the restrictive capital and liquidity rules under the Basel III regulation as well as the restraining trade-based anti-money laundering regulations, which have raised the administrative compliance costs for large banks.	From the review of the article, there is less clarity on how the restrictive capital and liquidity rules under the Basel III accord have affected the value and volume of global trade finance.

## 2.5 Chapter Summary

The theoretical conceptual model expounds on the effect of the Basel III regulation on global trade financing. Specifically, the high-risk weight of the trade finance assets (up to 150%) under the Basel III regulations increased the cost of trade finance, especially for large banks following the advanced approaches. The ultimate consequence of the restrictive capital and liquidity rules under the Basel III regulation is that the large banks had to reallocate their assets from trade finance to other profitable segments. The empirical insight based on Lasaga (2019) also highlighted that the high capital ratio (6%) and leverage ratio (4.0%) under the Basel III accord created considerable opportunities for regional banks and other non-bank financial institutions. Therefore, the credit risk management challenge caused by the restrictive capital and liquidity rules seem to have reduced the value and volume of international trade finance. The restrictive trade-based anti-money laundering regulations and the Know Your Customer (KYC) regulatory requirements under the Basel III accord have also continued to an increase in administrative/compliance costs for large banks, and therefore rendered international trade finance assets less attractive.

## CHAPTER 3: METHODOLOGY

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### 3.1 Introduction

The study examines the challenges and credit risk management issues faced by commercial banks after the adoption of the Basel III capital and liquidity rules. This chapter describes how a mixed research design using quantitative statistical design and systematic review was adopted to answer the three research questions. The research method section also describes the source of data and sampling design that was undertaken as part of the research study to attain the project aims.

### 3.2 Research Design and Strategy

#### 3.2.1 Quantitative Research Design

A mixed research design is adopted using both quantitative and qualitative data analysis approaches. The quantitative research design estimated a linear regression model specification of the following form to ascertain the effect of the dummy variable (pre and post Basel III) on the value of global trade finance.

$$\text{Trade Finance Assets} = \alpha + \beta_1 \text{Basel III} + \varepsilon \text{ [Equation 1]}$$

Where;

Trade Finance = Value of global trade finance assets (USD billion)

Basel III = Dummy variable {0 = Pre-Basel III and 1 = Post-Basel III}

In the stated regression model specification, the global value of trade finance assets is incorporated as the model's endogenous dependent variable, which is affected by the restrictive capital and liquidity rules under the Basel III accord. The dummy variable (Basel III) is integrated as an independent explanatory factor variable, which assumes a value of zero for pre-Basel III period and a value of one (1) for post-Basel III period. Based on the insight from Lasaga (2019) as well as Auboin and Blangini (2019), the pre-Basel III was specified as the period before year 2014 while the post-Basel III is defined as the period from year 2014 onwards. The stated definition of the time period for the research analysis is informed by the fact that majority of the national jurisdictions across the globe had fully implemented the Basel III regulations by the beginning of year 2014.

The other aspect of quantitative research design to generate solution to the three research questions pertains to the performance of inferential statistical analysis. Specifically, the inferential statistical analysis focused on the paired samples t-test to establish whether there is any statistically significant difference in the mean value of trade finance assets during the pre-Basel III and the post-Basel III regulation. The paired samples t-test hypothesis, which was evaluated at the 5% significance level, was based on assessment of the following null and alternative hypothesis formulation;

$H_0$ : There is no difference in the value of trade finance during the pre and post Basel III period.

$H_a$ : The value of trade finance asset during the post-Basel III period is less than the value of trade finance assets during the period before the implementation of the Basel III accord.

### 3.2.2 Qualitative Research Design

The qualitative research design entailed the adoption of systematic review of prior studies to examine the challenge of credit risk management faced by commercial banks, especially after the adoption of the Basel III regulations. The main strength of the qualitative research design based on the systematic review of existing literature is that it is an efficacious approach in generating qualitative insight associated with a given research phenomenon (Creswell, 2014). However, for less experienced researchers, the systematic review approach can generate biased and less reliable insight, especially if the prior research studies do not meet the specified criteria with respect to the duration (time period of study), research topic, and database (Saunders, Lewis & Thornton, 2016). Table 3.1 describes the general approach that was adopted to derive qualitative insight from the systematic review design.

Table 3.1

#### *Summary of the Structured Systematic Review Search Design*

<b>Phase</b>	<b>Description</b>	<b>Number of Studies</b>
Identification	Keywords/phrases, Database, Duration.	51
Screening	Review of research titles and abstracts	25
Eligibility	Full text article review	15
Selection (Included)	Meet criteria for relevance and reliability	10



The structured selection of the systematic review articles first entailed the identification of the keywords/phrases (trade finance, credit risk management, Basel III accord), databases (WTO, BIS, ICC) and the duration of the study (period from 2010 to date). Initially, 51 articles were identified using the stated structured criteria. However, after screening of the titles and abstracts/executive summary for relevance, the original number of articles was trimmed down to 25. After the eligibility review, which entailed the analysis of the full texts, 15 studies were selected from the 25 articles that were chosen after screening. A final list of 10 studies, which meet the relevance criteria in terms of their focus on credit risk management and trade finance under the Basel III regime was selected. These studies were also sourced from reputable databases.

Thematic analysis, which is a qualitative data analysis approach was applied to generate broad themes on the challenges faced by commercial banks in trade finance after the implementation of the Basel III accord. The thematic analytical approach also generated key themes with respect to the strategies that can be adopted to address the credit risk management issues faced by banks after the promulgation of the Basel III regulations. The primary strength of the thematic analysis is that the approach is considered the most suitable in analyzing qualitative data (Sekaran & Bourgie, 2016). However, its reliability can be questioned based on the fact that the approach is highly subjective, which creates a risk that two or more research analysts might come up with different themes on the same research topic (Saunders, Lewis & Thornton, 2016).

### **3.3 Data and Sampling**

The empirical portion of the research study relied on published secondary data on global trade finance, which was retrieved from two data repository websites. The international trade data was retrieved from the World Trade Organization (WTO) while the global trade finance data was obtained from the Bank of International Settlement (BIS). These data repository sites were selected due to their authenticity and reliability compared to other sites. Data reliability and authenticity is an important consideration when using published secondary data to conduct research (Creswell, 2014). The use of published secondary data was preferred due to convenience and the cost-effectiveness aspect, especially given the ease of access of publicly available data. However, published data can also be biased, especially if the information is sourced from less reputable sources (Sekaran & Bourgie, 2016).

In terms of sampling, the quarterly data on global trade finance was retrieved over a 14-year period from quarter one (Q1) year 2008 to quarter 4 (Q2) year 2019. The stated sampling period was appropriate given that it captured both the pre-Basel (before year 2014) and the post Basel III (after year 2014) period. In total, the published data on global trade finance was presented in 48 quarters. According to Saunders et al. (2016), selective sampling is appropriate where the researcher seeks to attain a specified research objective that cannot be adequately captured through random sampling approach. In this case, selective sampling is relevant given that the research aims to examine the variation in global trade finance over the pre-Basel III and the post-Basel III period.

### **3.4 Data Analysis**

The empirical portion of the research study estimated a regression model to examine the effect of Basel III accord on global trade finance. Additionally, as part of the quantitative empirical approach, statistical inferential analysis was undertaken to compare the average value of global trade finance during the pre and the post-Basel III period. The data analysis was conducted in Eviews statistical software. The statistical level (threshold) of 5% was used to assess the significance of the mean difference and the estimated regression coefficient that captures the Basel III regulation.

### **3.5 Chapter Summary**

A mixed research design using both empirical quantitative statistical analysis and qualitative systematic review was implemented to answer the three research questions for the study, which focused on evaluation of credit risk management challenges faced by commercial banks after implementation of the Basel III guidelines. The research methodology chapter described how a linear regression model was estimated to ascertain the effect of the Basel III regulations on the global value of trade finance. Statistical inferential analysis based on the paired samples t-test was adopted to evaluate whether the mean difference of the global trade finance during the pre and post Basel III accord was significant. Data was sourced from the WTO and the BIS websites.

## CHAPTER 4: FINDINGS

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### 4.1 Introduction

The research findings chapter presents the results of statistical regression and inferential t-test analysis. The outcome of the quantitative statistical analysis seeks to answer the first research question related to the effect of the Basel III credit risk management rules on global trade finance. The second part of the research findings presents the outcome of the systematic review of prior literature to generate concrete solution to the second and the third research questions.

### 4.2 Quantitative Statistical Results: Effect of Basel III Accord on Global Trade Finance

#### 4.2.1 Descriptive Statistics

A summary of the descriptive statistics based on the average value of global exports and the proportion of global exports financed by intermediary banking and non-banking institutions is depicted in Table 4.1 below. The average value of global exports over the period, 2007-2018 was USD 19.9 trillion. The descriptive statistics also depict that the average value of the global intermediate exports was USD 12.9 trillion over the period from Year 2007 to 2018. On average, this represents 64.5% of the global exports of goods and services, which are financed by intermediaries, including banks and non-bank financial institutions. The results are fairly consistent with the insight based on WTO (2020) and IFC (2020) who estimate that approximately 65% to 80% of international trade transactions are financed credit and/or credit insurance. The descriptive outcome indicates that challenges in accessing of trade finance is likely to have an adverse effect on the global trade of merchandise goods and services, which depends on credit facility from financial intermediaries.

Table 4.1

*Average Value of Global Exports and Proportion of Intermediate Exports*

<b>Year</b>	<b>Global Exports (\$M)</b>	<b>Global Intermediate exports (\$M)</b>	<b>Percentage of Intermediate Exports</b>
2007	16,111,433	10,125,989	62.8%
2008	18,297,501	11,791,456	64.4%
2009	14,646,938	9,134,747	62.4%
2010	17,476,534	11,199,131	64.1%
2011	20,908,195	13,681,785	65.4%
2012	20,746,669	13,528,511	65.2%
2013	21,325,347	13,995,352	65.6%
2014	21,790,135	14,177,608	65.1%
2015	21,790,135	14,177,608	65.1%
2016	19,760,653	12,726,200	64.4%
2017	22,216,243	14,406,377	64.8%
2018	24,262,566	15,783,520	65.1%
<b>Average</b>	<b>19,944,362</b>	<b>12,894,024</b>	<b>64.5%</b>

Source: WTO (2020); BIS (2020)

Figure 4.1 depicts the trend in the value of global trade finance over the period from Year 2007 to 2019. After the 2007-2008 global financial crisis, the value of global trade finance increased markedly over the period from Year 2009 to the Year 2013. However, based on the review of the trend graph, the value of global trade finance appears to have declined slightly after the adoption of the Basel III capital and liquidity rules during the post-Year 2014. Auboin and Blangini (2019) as well as Lasaga (2019) observe that immediately after the implementation of the Basel III guidelines, the non-bank financial institutions and other regional banks took the opportunity and maintained the trade finance business. This situation explains the stable trend in the value of global trade finance after the Year 2016. The period from 2016 to 2019 has witnessed a stable trend in the value of global trade finance.

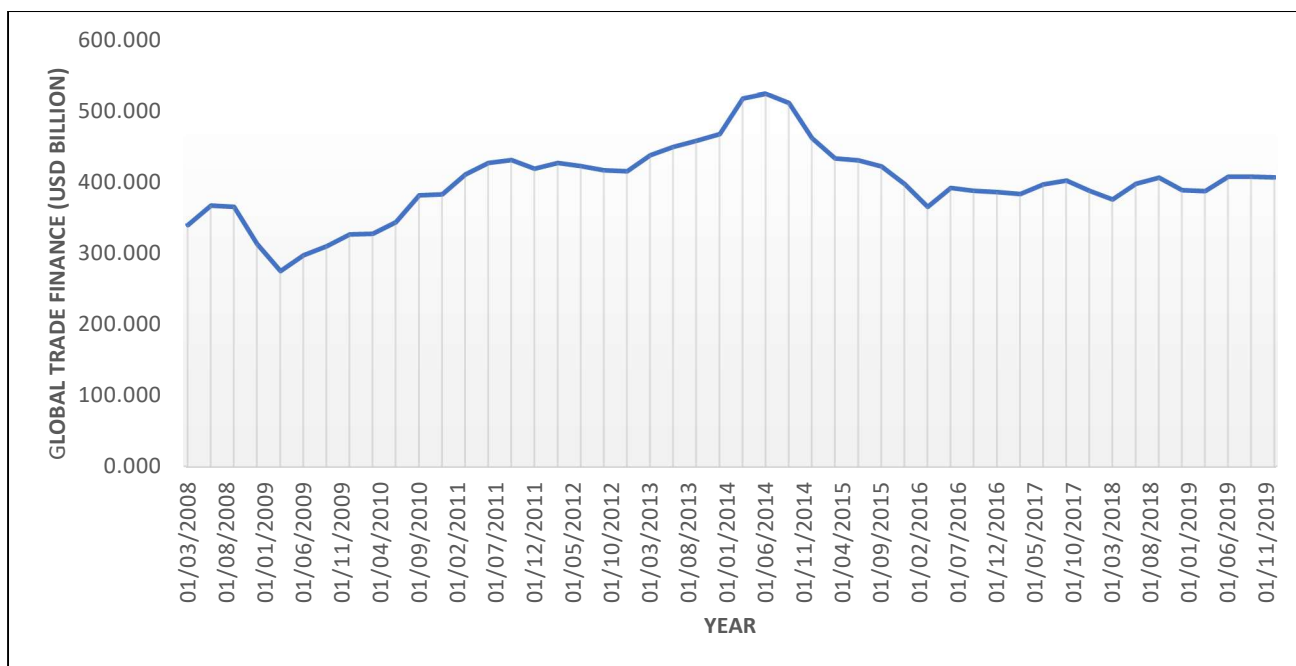


Figure 4.1. Trend in Value of Global Trade Finance: Year 2007-2019: Source: BIS (2020)

#### 4.2.2 Regression Analysis Assumptions

The reliability of the regression analysis approach depends on the extent to which the three OLS assumptions of normality, constant residual variance (homoscedasticity) and no serial correlation are attained in the estimated model (Lumley et al., 2002). This subsection of the findings presents a brief description of the OLS regression assumption tests, which are evaluated at the 5% significance level.

**Autocorrelation Test:** The outcome of the Breusch-Godfrey serial correlation test to assess the validity of the no serial correlation in the trade finance data is depicted in Table 4.2. There is no statistical evidence of serial correlation in the quarterly global trade finance data series given that the F-statistics ( $F = 127.216$ ;  $p < 0.05$ ) is significant. The implication is that the residuals of the estimated quarterly global trade finance data are not serially correlated when evaluated at the 5% significance threshold level.

Table 4.2

*Breusch-Godfrey Serial Correlation LM Test*

	<b>Coefficient</b>	<b>p-value</b>
F-statistics	127.216	0.000
Observed*R-Squared	40.923	0.000

**Normality Test:** The outcome of the Jacque-Bera normality test is presented in Table 4.3 below. The Jacque-Bera test statistic ( $JB = 0.881$ ;  $p > 0.05$ ) is not significant when assessed at the 5% threshold level. The conclusion is that there is significant evidence to accept the null hypothesis of normality in the residuals of the estimated quarterly global trade finance data.

Table 4.3

*Jacque-Bera Normality Test*

	<b>Coefficient</b>	<b>p-value</b>
Jacque-Bera Test Statistics	0.881	0.644
Number of Observations	48	

**Serial Correlation Test:** The results of the heteroscedasticity constant variance test based on the Breusch-Pagan test statistics is presented in Table 4.4. The F-statistics ( $F = 1.474$ ;  $p > 0.05$ ) does not meet the statistical significance threshold at the 5% level. The inference based on the Breusch-Pagan test is that there is evidence to accept the initial hypothesis of constant variance in the residuals of the estimated global trade finance model. This means that there is no evidence of heteroscedasticity in the residuals of the estimated model.

Table 4.4

*Breusch-Pagan Heteroscedasticity Test*

	<b>Coefficient</b>	<b>p-value</b>
F-statistics	1.474	0.2308
Observed*R-Squared	1.491	0.222

### 4.2.3 Regression Analysis

The outcome of linear regression analysis to estimate the effect of the Basel III regulation on the value of global trade finance is depicted in Table 4.5. Specifically, the estimated coefficient that captures the Basel III regime ( $\beta = 31.90$ ;  $\rho = 0.034 < 0.05$ ) is statistically significant and positive. The results of the estimated global trade finance model indicate that the Basel III credit risk management regime had a significant positive effect on the value of global trade finance during the period after the year 2014. Specifically, given the model's significance [ $F_{(1, 47)} = 4.793$ ;  $\rho < 0.05$ ], the implication of the findings is that the full implementation of the strict capital and liquidity credit risk management rules under the Basel III guidelines had a significant positive effect in raising the value of global trade finance post 2014. The estimated coefficient of Basel III regime indicates that on average, adoption of the Basel III guidelines raised the global value of trade finance by USD 31.9 billion. However, the estimated model's adjusted  $R^2$  (0.075) indicates that the Basel III regime explained only 7.5% of the variation in the global value of trade finance over the period of analysis. The implication is that there are other factors, including interest cost and gross domestic product (GDP) that might account for the movement in the global value of trade finance.

Table 4.5

*Summary of the Trade Finance Regression Model*

	<b>Coefficient</b>	<b>p-value</b>
Intercept	384.75	0.000
Basel III	31.90	0.034
$F_{(1, 47)}$	4.793	0.034
Adjusted $R^2$	0.075	
Number of Observations	48	

#### 4.2.4 Inferential Analysis: Independent Samples t-test

The inferential independent samples t-test sought to confirm whether there is a significant difference in the mean value of the global trade finance over the pre and the post Basel III period. The independent samples t-test outcome indicates that the mean difference in the global value of trade finance (MD = -31.90;  $t = -2.189$ ;  $p < 0.05$ ) is statistically significant. This means that the initial hypothesis of no difference in the value of global trade finance during the pre and post Basel III regime is not accepted at the 5% significance threshold level. The results indicate that the average value of global trade finance increased significantly during the period after Year 2014, which represents the year in which almost all national jurisdictions had adopted the Basel III credit risk management guidelines. Therefore, based on the independent samples t-test, there is considerable evidence to suggest that the mean value of global trade finance during the post-Basel III is higher compared to the average value of global trade finance during the period before adoption of the Basel III guidelines.

Table 4.6

##### *Summary of the Independent Samples t-test*

	<b>Mean</b>	<b>t-statistics</b>	<b>p-value</b>
Mean Global Trade Finance (Pre-Basel III) (\$ Million)	384.75		
Mean Global Trade Finance (Post-Basel III) (\$ Million)	416.65		
Trade Finance (Pre-Basel III) – Trade Finance (Post-Basel III)	-31.90	-2.189	0.034



## 4.3 Qualitative Thematic Analysis Findings

### 4.3.1 Challenges of Credit Risk Management in the Context of Trade Finance

Thematic analysis of prior studies and literature was used to evaluate the credit risk management challenges faced by banks and non-banks financial institutions engaged in global trade finance. Table 4.7 highlights the key broad themes that capture the credit risk management challenges and the strategies adopted by the large banks in response to the restrictive capital and liquidity rules that were adopted under the Basel III regime.

Table 4.6

*Summary of the Broad Themes: Credit Risk Management Challenges under Basel III*

	Number of Studies	Percentage
High Cost of Trade Finance	10	100%
Risk from Trade-Based Money Laundering	7	70%
KYC and Anti-money Laundering Regulations	6	60%
Unattractiveness of Trade Finance	5	50%

**Cost of Trade Finance:** The insight from the systematic review of the prior evidence indicates that all the reviewed 10 articles cited the high cost of trade finance under the Basel III regime as a major barrier that has restricted the growth of trade financing, especially among the large banks following the advanced approaches. Due to the increased risk-weight of the trade finance assets (up to 150%), the small banks following the standardized approaches experienced a 23.3% increase in the cost of trade finance while the large banks following the advanced approaches faced a 42.6% increase in the total cost of trade finance by the end of year 2019. Furthermore, Auboin and Behar (2020) observes that as a result of the new Basel III guidelines, the cost-to-income ratio of the commercial banks engaged in trade finance is estimated at between 50% to 60%. The implication is that more than half of the revenues realized from international trade finance is allocated towards covering operational costs even before the costs associated with the restrictive capital and liquidity rules is taken into account.

**Trade-Based Money Laundering Risk:** The thematic analytical insight from the systematic review of prior studies found that 70% (seven of the ten selected studies) cited the risk associated with the trade-based money laundering as an inherent factor aspect that has restricted

the ability of the commercial banks from advanced nations to engage in trade finance. Chao et al. (2019) reports that the increased monitoring costs and restrictive monitoring regulations, including the need to comply with the KYC regulations in order to mitigate the trade-based money laundering risk has also created considerable challenges for the large banks. As noted by Musa (2014), the high risk associated with the trade-based money laundering and the associated high costs has meant that majority of the banks from advanced nations have either closed-off small accounts or completed ceased operations in the developing countries.

**KYC and Anti-Money Laundering Regulations:** The banks, which operate in national jurisdictions that are guided by the Basel III rules are required to conduct due diligence of all customers in the form of Know Your Customer (KYC). The implication is that under the KYC rules, banks are required to confirm the exact legal identity of their customers to mitigate the risk of individuals engaging in terrorism and, or money laundering (Thieffry, 2011). The thematic analysis found that 60% of the reviewed studies acknowledged the stringent KYC and anti-money laundering regulations as barriers that impede the growth of trade finance among banks and other financial institutions subjected to the Basel III guidelines. Suleiman (2014) observes that the strict KYC regulations, which have increased the administrative and documentation costs for large banks have made some banks to reconsider continuing their trade finance operations in high risk developing nations.

**Unattractiveness of Trade Finance:** The findings from the thematic analysis indicate that five of the ten reviewed studies (50%) cited the unattractiveness of trade finance as a key outcome that complicated credit risk management, especially for banks that are following the advanced approaches. The high capital adequacy ratio (6%) and the leverage ratio (4%) coupled with the high-risk weight of trade finance assets under the Basel III regime made some of the large banks to switch their business operations from trade finance to other profitable segments. Additionally, Auboin and Blengini (2019) also state that the 100% leverage tax due to the leverage ratio that is in excess of 3% meant that the short-term trade credit was highly unattractive for majority of the large banks using the advanced approaches.

## **4.4 Chapter Summary**

The findings section presented the outcome of quantitative empirical analysis and qualitative thematic insight. The quantitative statistical results indicate that the Basel III credit risk management guidelines had a significant positive effect on the value and volume of the global trade finance. The qualitative thematic analysis indicates that there are four main broad themes, which capture the challenges faced by commercial banks engaged in international trade. These indicate the rise in the cost of trade finance, unattractiveness of trade finance, trade-based money laundering risks as well as the restrictive KYC and anti-money laundering regulations.

## **Chapter 5: Summary, Conclusions, and Recommendations**

### **5.1 Introduction**

The chapter presents a summary of the findings and implication of the results for the research aims and prior literature insight. The conclusion is drawn based on the insight from the implication of the findings for policy and practice. Finally, the chapter concludes by offering recommendations for practice and policy to address the credit-risk management challenges faced by banks engaged in trade finance. The limitation and proposal for future research are also presented.

### **5.2 Summary**

#### **5.2.1 Effect of the Basel III Regulations on the Value and Volume of Trade Finance**

The outcome from the quantitative analysis presented strong evidence, which highlighted the role of the Basel III credit risk management guidelines on the value and volume of global trade finance. The regression and inferential analysis indicated that the implementation of the strict capital and liquidity rules under the Basel III accord beginning of year 2014 had a significant positive effect in raising the value of global trade finance. The regression results showed that

the switch from the Basel II to the Basel III regime increased the global value of trade finance in contrast to the insight from prior research evidence such as Lasaga (2019) and Chao et al. (2019).

The explanation for the stated findings, which are inconsistent with some of the prior findings (i.e., Chao et al., 2019) is that the non-bank and other regional banks are likely to have taken advantage of the large trade financing gap, estimated at \$1.5 trillion to profit from the international trade financing business. In his paper, Lasaga (2019) acknowledges that the decision by large banks faced by the excess cost of trade finance to reallocate their capital resources from trade finance to other profitable segments that are unaffected by the Basel III rules created considerable business growth opportunities for smaller regional banks. The implication is that the Basel III regulations created a strategic opportunity for smaller banks using the standardized approaches to profit from the international trade finance business (Boissay, Patel & Shin, 2020). Therefore, the increased role of the smaller banks and other local non-bank institutions in global trade finance mainly explains the fact that the value of the international trade finance rose after implementation of the Basel III regulations.

### 5.2.2 Credit Risk Management Challenges in International Trade Finance under Basel III

The insight from the qualitative thematic analysis highlighted that the high cost of trade finance is one of the main factors that has created credit risk management challenge for commercial banks engaged in global trade finance. The high leverage ratio in excess of 3% and the strict liquidity rules under the Basel III regulations implies that for each dollar of trade finance asset investments, banks are forced to set aside given asset as a low-yield investment (HQLA) with a view to meet the liquidity coverage ratio. Besides, increased cost of trade finance was also associated with the need for banks to comply with the complex KYC and trade-based anti-money laundering rules.

The other credit risk management challenge faced by commercial banks engaged in international trade finance besides the high operational and administrative costs pertains to the risk associated with the trade-based money laundering (Berrios, 2013; Chao et al., 2019). According to Chao et al. (2019) and IFC (2020), the perceived high risks of trade-based money

laundering has made trade finance investments by large banks in developing countries to be a high-risk venture. The report by IFC (2020) acknowledges that some 200'000 correspondent banking relationships have ceased due to the perceived regulatory risks of operating in developing countries. The implication is that majority of the large multinational banks from developed countries feel that there is a high risk of damaging their reputation due to the perceived trade-based money laundering risks in some of the developed countries.

### 5.2.3 Solutions to Address Credit Risk Management Challenges under Basel III

There are several possible solutions, which have been offered to address the credit risk management challenges faced by banks under the current Basel III regime. First, the insight based on the review of the article by Auboin and Behar (2020) indicates that the adoption of new technology solutions including blockchain systems, which are considered safe can address the perceived risks associated with trade-based money laundering. The private blockchain technology solution has been noted to have a better transparency and traceability compared to the conventional international mode of payments (Cabral, 2019). This means that with the adoption of blockchain technology-based payment solutions, which is expected to facilitate \$1.1 trillion in new trade transactions, the risk from trade-based money laundering is likely to decrease significantly. Although blockchain has already been implemented in most banks, the platform is well-developed for transactions associated to international trade finance but there are still improvements to be made in the category of credit risk management. Anonymity in this sense poses some challenges but as the systems will mature and develop, it is expected to have adequate central data repository of credit data and other features adjusted for the purpose of optimizing the processes and analyses of credit risks.

Besides, the creation of credit funds and trade finance facilitation programs through various advocacy and mobilization programs is also expected to address the challenge of trade finance gap, which is estimated to exceed \$2.5 trillion by end of the year 2025. According to the report by Auboin and Behar (2020), multinational banks have already started to address the trade financing gap in developing countries by supporting over \$30 billion worth of international trade transactions in developing nations.

Education and training have also been cited as a key solution to address the knowledge gap in credit risk management especially among the partner institutions in developing countries. The lack of awareness and knowledge in adopting effective risk management strategies has restricted the ability of multinational banks to participate in global trade finance due to the perceived high trade-based money laundering risks. In this respect, WTO and the International Chamber of Commerce has already trained approximately 1'500 people in effective credit risk management (Auboin & Behr, 2020).

Finally, increased dialogue with banking regulatory agencies at the local level (central banks) and the international level (Basel Committee on Banking Supervision) has also been noted as a key aspect that can address the current credit risk management challenges faced by banks. There is a necessity for concerted efforts and dialogue to take place between the providers of trade finance and the regulators to ease the potential credit risk management challenges faced by banks. Through such platforms, there is a considerable likelihood that some of the restrictive capital and liquidity rules such as the 150% risk-weight on trade finance assets can be lifted.

### **5.3 Conclusion and Recommendations**

The study concludes and acknowledges that in contrast to prior empirical findings and reviews, the adoption of the Basel III regulations increased the value and volume of international trade finance. The new capital and liquidity rules, which were considered restrictive for large banks created opportunities for growth in global trade finance business among the small and regional development banks. This research thesis also acknowledges that the rise in cost of trade finance and the high risks attributed to the trade-based money laundering are some of the credit risk management challenges faced by large commercial banks engaged in international trade financing. The study also concludes and acknowledges that the restrictive capital and liquidity rules under the Basel III accord are likely to explain the bank asset reallocation strategies among the large financial institutions.

Therefore, based on the findings from the thesis, there are three possible policy recommendations that can address the credit risk management challenges faced by financial institutions engaged in global trade finance under the Basel III regime. First, the adoption of blockchain-based payment solutions can lower the risk of trade-based money laundering and decrease the high administrative costs associated with KYC compliance (Chang et al., 2020).

The second policy proposal is for various international trade organizations, including WTO, IFC, ICC and BIS to set up a credit fund to support the global trade finance transactions, especially in developing countries. Training and education can also enhance prudential credit risk management, especially for local and regional banks that participate in the global trade finance business. Finally, this thesis recommends that there is opportunity for constructive dialogue between the trade finance providers and the relevant local/international regulatory agencies, including the Basel Committee on Banking Supervision to review some of the restrictive capital and liquidity rules.

The topic of credit risk management in the context of international trade finance is a broad research area that was not comprehensively addressed in this research thesis. For instance, given that the findings from this research study noted that the adoption of Basel III accord increased the value of trade finance, there is potential for prospective research to examine the key efficacious credit risk management aspects under the new capital and liquidity rules, which promoted global trade finance. The implication is that there is an important research gap that can be addressed on the extent to which the Basel III regulation created opportunities for small local/regional banks, especially in developing countries to profit from the trade finance business.

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## Appendix

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### Exhibit 1: Linear Regression Model Output

Dependent Variable: TRADE\_FINANCE (USD\_BILLION)  
Method: Least Squares  
Date: 12/04/20 Time: 14:50  
Sample: 2008Q1 2019Q4  
Included observations: 48

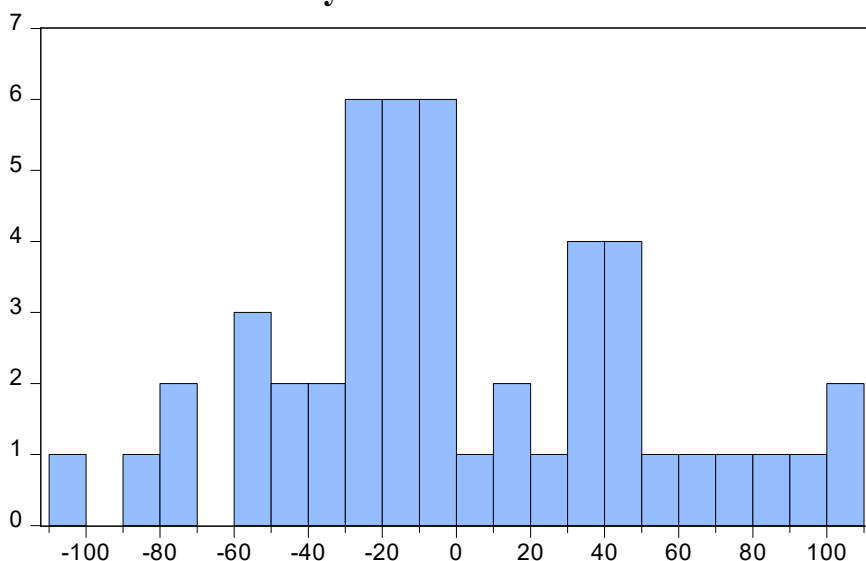
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	384.7481	10.30383	37.34031	0.0000
BASEL_III	31.90148	14.57181	2.189260	0.0337
R-squared	0.094361	Mean dependent var		400.6988
Adjusted R-squared	0.074673	S.D. dependent var		52.47549
S.E. of regression	50.47823	Akaike info criterion		10.72174
Sum squared resid	117210.4	Schwarz criterion		10.79970
Log likelihood	-255.3216	Hannan-Quinn criter.		10.75120
F-statistic	4.792860	Durbin-Watson stat		0.152225
Prob(F-statistic)	0.033690			

### Exhibit 2: Serial Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	127.2156	Prob. F (2,44)	0.0000
Obs*R-squared	40.92299	Prob. Chi-Square (2)	0.0000

### Exhibit 3: Normality Test



Series: Residuals	
Sample 2008Q1 2019Q4	
Observations 48	
Mean	-3.63e-15
Median	-9.119387
Maximum	108.6465
Minimum	-108.9567
Std. Dev.	49.93834
Skewness	0.279750
Kurtosis	2.642956
Jarque-Bera	0.881043
Probability	0.643701

### Exhibit 4: Heteroscedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.474468	Prob. F (1,46)	0.2308
Obs*R-squared	1.490790	Prob. Chi-Square (1)	0.2221
Scaled explained SS	1.124723	Prob. Chi-Square (1)	0.2889

### Exhibit 5: Statistical Independent Samples t-test Output

#### Group Statistics

	Basel III	N	Mean	Std. Deviation	Std. Error Mean
Trade Finance (USD billion)	.0	24	384.74808	55.889495	11.408395
	1.0	24	416.64956	44.412469	9.065657

#### Independent Samples Test

	Levene's Test for Equality of Variances	t-test for Equality of Means								
		Levene's Test for Equality of Variances		t-test for Equality of Means			95% Confidence Interval of the Difference			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Trade Finance (USD billion)	Equal variances assumed	3.647	.062	-2.189	46	.034	-31.901481	14.571809	-61.233012	-2.569950
	Equal variances not assumed			-2.189	43.767	.034	-31.901481	14.571809	-61.273455	-2.529507