INTRODUCTION

Banks are very important organizations which aid in the execution of socioeconomic activities undertaken by individuals, business organizations and even sovereign states. They serve primarily as a medium which bridges the gap between surplus and deficit spending units in an economy (Damankah, Anku-Tsede and Amankwaa 2014). Based on this, it can be seen that the traditional role of commercial banks has centred on intermediation and the generation of net interest income through two core activities; namely, the collection of deposits on which banks pay interest and the issuing of loans for which they receive interest income (Craigwell and Maxwell 2005). Over the years, net interest income has been the major source of revenue for commercial banks, however, in the past few decades, we have seen a transformation whereby non-interest income no longer plays a supporting role but a major contributor to bank profitability.

SCOPE AND OBJECTIVE

This study focuses not on individual commercial banks but on the commercial banking industry in Trinidad and Tobago. It will seek to explain the factors influencing commercial banks' decision to engage in more non-interest income earning activities which affects all stakeholders. The rationale for this shift in income earning was influenced by several factors and was done with the intention of reducing the volatility of the banks' income stream, supplementing interest income or both. The factors which will be analysed by this paper are consumer deposits, consumer loans, commercial bank liquidity, commercial bank investments and non-performing loans which is used to represent risk in interest earning activities. Interest income and inflation will also be included as instruments in the econometric model.

The paper will proceed as follows: Stylized facts looks at the trends in non-interest income, the literature review examines existing literature on the topic, the methodology details the econometric techniques used and the choice of variables which is followed by the econometric results and a discussion of

findings and concluding remarks as well as recommendations and limitations ends the paper.

STYLIZED FACTS

Table 1 shows non-interest income as a percentage of gross income and compares it with growth of the overall economy in the form of Gross Domestic Product (GDP) growth and growth of the banking industry in the form of the growth rate of total banking industry assets over the period of March 2009 to December 2017.

Table 1: Comparison of non-interest income and GDP growth and the growth rate of total assets

Date	Non-interest Income-to-Gross Income (%)	GDP GROWTH	GROWTH RATE OF TOTAL ASSETS
Dec-2017	32.9	-1.2	0.377955524
Sep-2017	32.1	2.7	-0.239674977
Jun-2017	32.3	-3.5	-0.703806359
Mar-2017	32.2	-6	-0.554152536
Dec-2016	34.8	-6.8	2.566569471
Sep-2016	33.1	-11.9	-1.165197674
Jun-2016	32.6	-8.2	0.405396473
Mar-2016	32.9	-5.3	1.020120486
Dec-2015	38.8	-1.4	-1.316386745
Sep-2015	39.2	-1.6	1.990740741
Jun-2015	40.3	-2.6	1.003092239
Mar-2015	37.9	-1.6	-0.799054303
Dec-2014	40.1	-0.2	3.646204907
Sep-2014	39.7	2.2	0.23240088
Jun-2014	40.1	3.1	-0.475602899
Mar-2014	42.2	0.9	1.769165965
Dec-2013	35	3.3	0.593333491
Sep-2013	34.6	1.9	1.883557509
Jun-2013	33.7	4.7	0.860578211
Mar-2013	34.8	4.9	2.24116607
Dec-2012	34.6	0.8	4.436738763

Sep-2012	34.4	1.9	3.143804934
Jun-2012	33.3	-2.1	0.516788898
Mar-2012	32.9	1.4	0.168351684
Dec-2011	35.2	0	2.154799787
Sep-2011	36.1	-0.5	4.29719723
Jun-2011	33.3	1.6	0.662366754
Mar-2011	33.2	-3.6	0.12151137
Dec-2010	33.1	-0.5	2.572878439
Sep-2010	32.8	1.8	-1.60786413
Jun-2010	31.9	-0.2	0.110102112
Mar-2010	33	2	-1.301149204
Dec-2009	32.1	0.8	8.912871797
Sep-2009	32	-6.2	3.751107054
Jun-2009	30.7	-3.3	1.235305378
Mar-2009	30.7	-4.8	3.209698241

As shown above, non-interest income accounts for a sizeable proportion of the banking industry's gross income which highlights the relevance of this topic and why commercial banks have placed more emphasis on this over the years. These non-traditional activities contribute billions to yearly commercial bank profits and has become a vital subcomponent of commercial banking revenue. Non-interest income increased from 30.7% in March 2009 to its peak of 42.2% in March 2014 after which it decreased most periods thereafter until reaching 32.9% in the last quarter of 2017.

From the table we can also see that an increase in the growth rate of banking sector is usually accompanied by an increase in non-interest income as a percentage of gross income meaning that as banks grow in size, so too does their involvement in non-interest income earning activities. Conversely, in the earlier time periods, the relationship between GDP growth and non-interest income is very ambiguous however it is noteworthy that in the eleven consecutive quarters of negative GDP growth between December 2014 and June 2017, non-interest income decreased in nine of those quarters falling nearly 8% from 40.1% in December 2014 to 32.3% in June 2017. As will be

evidenced later on, this indicates that these variables were trending in the same direction during that period.

LITERATURE REVIEW

Non-interest income refers to income generated by commercial banks through non-traditional sources i.e. outside of their usual interest earning activities. In 2017 noninterest income accounted for 32.9% of Gross Profit made by commercial banks in Trinidad and Tobago (Central Bank of Trinidad and Tobago 2018). Sources of non-interest income include trading revenue such as buying and selling of foreign exchange and the sale of securities, service charges e.g. account maintenance and failure to maintain a minimum balance, the sale of assets and most importantly fee income such as deposit fee, maintenance fee. Non-interest income is often referred to as fee income as fees constitute the majority of non-interest income (Feldman and Schmidt 1999).

Of the $4.2 billion dollars in profit made by commercial banks in Trinidad in 2016, fee income represented $1.9 billion alone (Sorias 2017).The increasing trend toward noninterest income was not isolated to Trinidad and Tobago alone. In fact, (Kaufman and Mote 1999) found that noninterest income ratios, namely noninterest income to operating revenue and noninterest income to assets, increased in the banking sectors of virtually all developed countries between 1982 and 1990. Noninterest income in the U.S. commercial banking system increased from 0.77% to 2.39% of aggregate banking industry assets and increased from 20.31% to 42.20% of aggregate banking industry operating income between 1980 and 2001 (DeYoung and Rice, Noninterest Income and Financial Performance at U.S Commercial banks 2003).

For some countries, this upward trend has not been the case however as exampled by Barbados where between 1985 and 2001, non-interest income in the commercial banking system decreased from 2.45% to 2.18% of aggregate banking industry assets and fell from 39.4% to 33.5% of aggregate banking industry operating income (Craigwell and Maxwell 2005).

The changing dynamics of the banking industry over the years have made it essential for commercial banks to be innovative and proactive in conducting their business in order to remain profitable, thus leading to the increased importance of earning non-interest income. According to Craigwell and Maxwell, the four main factors that could have led to the prevalence of non-

interest income are deregulation, supervision, globalization and rapid technological advances in information flows, communications infrastructure and financial markets.

Banking industry deregulation removed a whole host of restrictions that had stunted the evolution of the banking industry, constrained the efficiency of financial product markets, and extended the lives of thousands of poorly run and/or suboptimal-sized commercial banks (DeYoung and Rice, Noninterest Income and Financial Performance at U.S Commercial banks 2003). The deregulation of the banking system in the United States came in the form of three pieces of legislation Regulation Q, Gramm-Leach-Bliley and Riegle-Neal (Craigwell and Maxwell 2005). In short, these laws allowed banks to pay market rates of interest to depositors which allowed them to unbundle deposit pricing (whereby they compensated customers for below market returns by giving away certain services) in favour of separate charges for individual retail deposit pricing, move across state boarders and expand their operations into other financial services (which are mostly fee based) that were unrelated to traditional bank intermediation. These changes in legislation allowed banks the opportunity to extract more non-interest income from its customers. Deregulation caused increased competition in the banking industry, not only with other commercial banks but also non-banking financial institutions as well such as insurance companies. In response to this, the larger commercial banks were able to change their product mix and embrace new technologies to meet the unique demands of its customers, resulting in large increases in non-interest income. There are however some banks, mostly small or community-based, that maintained their traditional banking operations whereby non-interest income remains of little to no importance to them.

Technology has brought about a complete paradigm shift in the functioning of banks and delivery of banking services (Ankrah 2012). Advances in information and communications technology (for example, Internet and Mobile banking and Automatic Banking Machines (ABMs), new intermediation technologies for processes like loan securitization, credit scoring and the introduction and expansion of financial instruments and markets (high yield bonds, commercial paper, financial derivatives) all impacted on the levels and

types of non-interest income at commercial bank (Craigwell and Maxwell 2005). Technology is constantly upgrading and many of these new technologies place more of an emphasis on non-interest income as opposed to interest income. For example, Republic Bank Limited (RBL), the largest bank in the country in terms of market share, has recently launched their cardless cash service (Express 2018). With this service customers can, for a fee, withdraw money from their bank account at any ABM without the use of a bank card. According to the Banks's general manager of Electronic Channels and Payments Division, Denyse Ramnarine this service is 'the first of its kind in the Caribbean'. However, given the oligopolistic market within which banks operate, it will not be long before other commercial banks adopt the technology as well. The above example highlights the manner in which commercial banks extract fees from customers due to innovation in technology which enhances the customer's experience and convenience.

Loan securitization refers to the process of taking a group of loans e.g. mortgages and transforming it into a group of securities to be sold to investors e.g. mortgage-backed securities. Loan securitization allowed banks to better leverage their equity capital by moving loans off their balance sheet (Craigwell and Maxwell 2005), which decreases the importance of traditional intermediation activities in favour of more non-interest income. While in the early 2000's loan securitization played a role in increasing non-interest income in commercial banks, it also had a hand in restricting the amount of non-interest earning activities for banks in the US and Europe post financial crises. Due to sub-prime mortgages, mortgage backed securities played a central role in the financial crises in the United States which began in 2007 and was even responsible for bringing down one of the largest banks in the country i.e. Lehman Brothers (Gallant 2017). Prior to the crisis banks were increasing earning a higher proportion of their profits from non-interest income compared to interest income (Brunnermeier, Dong and Paliab 2012).However the crisis prompted a series of reforms in the United States and Europe (Dodd Frank Act, 2010; Liikanen Report, 2012 and the Independent Commission on Banking – Vickers Report, 2011) that recommend restrictions on various banks' non-interest income based activities (Abedifar, Molyneux and Taraz 2014). The

financial crises serves as a cautionary tale of the potential side effects of banks aggressively pursuing profits from non-traditional activities.

Globalization has also played a part in the prevalence of non-interest income in commercial banks. Globalization represents the global integration of international trade, investment, information technology and cultures (Investopedia 2018). In many cases, globalization has led to mergers and acquisitions which changed the dynamics of the banking industry. For instance, two of the four largest banks in Trinidad and Tobago, Scotiabank and Royal Bank of Canada, are both Canadian owned organisations and it is reasonable to assume that Canadian policies and procedures have been adopted and adapted for use in the local market. Globalization has even affected the locally owned banks in the sense that their business would be more exposed to foreign threats and will have to fall in line with world pricing benchmarks, especially in the area of fee-based activities like corporate finance and payments devices (Hawtrey 2003)

Ceteris paribus, increased non-interest income will improve bank earnings but will also change its' output mix, variable and fixed inputs as well as financing structure (Craigwell and Maxwell 2005). Banks sought out non-interest income with the belief that its differences from interest income, which is subject to interest rate risk and credit risk, would lead to greater diversification and thus a less volatile stream of income. In addition, non-interest income would be less dependent on overall business conditions than interest income thus an increased reliance on non-interest income can reduce the cyclical variation in banks' profits and revenue (Stiroh 2004). Some of the early empirical work on the impact of non-interest income on bank volatility supported this argument but this however may not be the case. For instance, (Staikouras and Wood 2003) investigated the impact of non-interest income on diversification at banks in fifteen European countries. While they found that non-interest income is more volatile than interest income over time, they found a negative correlation between the two streams of income meaning that non-interest income stabilises bank revenue.

Conversely, some studies, for instance DeYoung and Roland (2001), argue that noninterest income may actually increase bank volatility. They gave three potential reasons for this. Firstly, it was proffered that bank loans are more relationship based when compared to fee-based activities and as a result they have higher switching costs making interest income less volatile. Secondly, the main input needed to produce more loans is variable i.e. interest expense whereas the main input needed to produce more fee income is relatively fixed i.e. labour expense. This causes fee income to require more operating leverage making bank earnings more volatile. Lastly, fee-based activities require the bank to hold little or no regulatory capital therefore making fee income more likely to employ greater financial leverage compared to traditional lending activities making the level of bank revenue more volatile.

The exact impact of non-interest income on the volatility of bank earnings is still unclear and may be data as well as environment specific. What is clear is that changing the banks' product mix to include more non-interest income generating activities will provide the bank with a more diversified stream of income. However, this diversification would only be beneficial if changes in interest income and non-interest income do not move in the same direction and are of the same magnitude. The above was exampled in the study done by Damankah, Anku-Tsede and Amankwaa (2014). They estimated two multiple regression equations (one including and the other excluding inflation) based on the ratio of non-interest income to total assets. In their results they found the relationship between the two variables to be positive and significant. They indicated however that it is possible that in the Ghanaian banking industry, non-interest income and interest income are capable of co-existing.

The econometric model used to test the impact of non-interest income on financial performance of commercial banks by (Craigwell and Maxwell 2005) which drew from an earlier empirical model used by DeYoung and Rice (2003) was based on three equations whereby non-interest income as a percentage of assets, bank profitability and variability of bank earnings were the dependent variables. In both studies, non-interest income as a percentage of assets was both a dependent variable and an independent variable in the other equations and therefore it was the main focus of their discussions. Although a similar

methodology was used, there was some variance in the results obtained. For instance, Craigwell and Maxwell found that the relative performance of banks and the bank environment were both insignificant in explaining non-interest income in Barbados which was contrary to the results obtained by DeYoung and Rice. In addition, the variable indicating bank size was significant but negative for the study done on Barbados as well as the study done in Ghana whereas it was significant and positive for the study completed in the US. Thus, larger banks in Barbados and Ghana generated less non-interest income than smaller banks.

METHODOLODY

This study adopts an econometric approach to uncover the factors that are driving the prevalence of non-interest income in commercial banks. All tests were conducted using the EViews 7 program. The tests that were employed include the Generalized Method of Moments (GMM) and the Hodrick-Prescott filter (HP filter).

MODEL SPECIFICATION

For the banking industry data, figures from the consolidated income statement and balance sheet of all 8 commercial banks were used. This data was easily accessible on the website of the Central bank of Trinidad and Tobago and quarterly data from March 2009 to March 2018 (the earliest and most recent data points that were available respectively) was obtained for the study. These quarters provided thirty-seven data points for econometric analysis.

The variable of focus for this study, non-interest income, was found in the consolidated income statement of the commercial banks whereby interest earning activities and non-interest earning activities were clearly separated. The non-interest income portion of the income statement was comprised of fee income (which was further subdivided into the numerous types of fees e.g. service fees, loan fees, deposit account fees etc.), dividend income, rental income, profit/loss from foreign exchange, income from trustee services and other income. The various subcomponents were totalled which generated non-interest income for all commercial banks in Trinidad and Tobago. A detailed breakdown of the commercial bank income statement for 2016 can be found in the appendix. This non-interest income figure was then divided by gross commercial bank income (interest income plus non-interest income) to give us non-interest income as a percentage of gross income, which was shortened to NII for the econometric model. This ratio, which shows the amount of non-

interest income that is generated per dollar of gross income, will be the dependent variable for this study and will be tested against the loan to deposit ratio, exposure to risk, bank liquidity and bank investments.

The model can therefore be specified as: NII= f {LTD, RISK, LIQ, INV}

EXPLANATION OF INDEPENDENT VARIABLES

Loan to Deposit ratio (LTD)- This variable simultaneously captures two important considerations (in the form of consumer loans and consumer deposits) that commercial banks study when making decisions relating to non-interest income. Consumer loans refer to the loans provided by commercial banks to their individual customers. Ceteris Paribus, the more loans that a bank issues will be the more interest income they shall receive. Such engagement in traditional activities has an impact on commercial banks' decisions to adopt non-interest income earning practices as non-interest income is used to supplement interest income and to provide a steady overall stream of income. One will assume that low levels of interest income will be accompanied by high levels of non-interest income (and vice versa) as a way to augment the shortfall in the income stream from traditional activities.

Consumer deposits on the other hand refers to deposits made by individuals at the various commercial banks in the industry. Deposits provide opportunities for banks to earn more non-interest income as increased deposits offer increased opportunities to extract maintenance fees, dormant account fees, withdrawal fees, deposit fees etc. and should, ceteris paribus, increase non-interest income. On the other hand, as a bank is able to mobilize more deposits, there is a higher propensity of it making more loans, hence a higher level of involvement in traditional activities (Damankah, Anku-Tsede and Amankwaa 2014). It is usually when their deposits are limited does their focus switch to non-traditional sources of revenue. It is suggested that as a bank is limited in the amount of deposits it can attract it will resort to producing a larger quantity of non-traditional activities in an attempt to find alternative sources of revenue (Rogers and Stinkey 1999).

This is the relationship that we hope to capture by using this variable as it is a representation of the level of intermediation occurring at commercial banks. With the level of deposits at commercial banks increasing annually over the last 8 years, an increase in this ratio means that a larger proportion of deposits are being converted into loans indicating that commercial banks are more focused on traditional activities as opposed to non-traditional activities. This variable was chosen for this study due to this precise relationship with non-interest income. (Lepetit, et al. 2008) Indicates that shifting away from intermediation towards non-traditional activities generates more non-interest income. Therefore a negative relationship is expected between the two variables. This variable is represented by total loans provided by commercial banking industry as a percentage of total deposits received by the commercial banking industry.

Bank liquidity (LIQ)- This refers to the highly liquid assets held by commercial banks to meet their short term obligations i.e. sufficient amounts of cash to meet demand for loans and withdrawals. Typical liquid bank assets include cash, short term investments and reserves held at the central bank. Since the financial crisis of 2007, liquidity has become one the major concerns of all financial institutions and this is especially the case with commercial banks. Insufficient liquidity and poorly structured non-traditional activities (e.g. sub-prime mortgages) played significant roles in the financial crises and led to the collapse of Lehman Brothers which was the fourth largest U.S. bank at the time of its collapse (Lioudis 2017).

Excess liquidity on the other hand would mean that the bank is less exposed to liquidity risk, however it may result in idle funds that could have been better used to increase returns to its shareholders. This variable was included in the study as it poses a dilemma for commercial banks. Commercial banks can view excess liquidity as an avenue for increased revenue through non-interest income or they can choose to use excess liquidity in the form of a safety net to avoid placing themselves in the same situation as Lehman Brothers did ten

years ago. Since more liquidity is required for banks to engage in non-interest income activities, a positive relationship between the two variables is expected (Damankah, Anku-Tsede and Amankwaa 2014). Bank liquidity is represented by the industry ratio of liquid assets to total assets.

Exposure to risk (RISK)- In any line of business, exposure to risk is a very important consideration. This is especially true in the case of commercial banks due to their specific nature. This variable was chosen for this study due to the potential of non-interest income to diversify away from the risk inherent in traditional operations i.e. credit risk and interest rate risk. According to Stiroh, non-interest income will be less affected by business conditions when compared to interest income, so its increased reliance has the ability to reduce the volatility of the banks' income stream. The level of risk from interest earning activities is therefore an important consideration when banks are deciding to engage in non-traditional activities. Banks subject to greater risk from traditional activities may find it necessary to invest heavily in non-traditional activities to act as a windfall against potential losses whereas banks subject to less risk may not see the need to invest in these activities.

To capture this variable, non-performing loans will be used as a proxy. These represent the proportion of loans issued by commercial banks that are being defaulted on and therefore is indicative of the inherent risk faced by banks when performing traditional business. For this study risk was represented by the industry sum of non-performing loans as a percentage of total loans and it is expected to have a positive relationship with NII i.e. as commercial banks face more risk from traditional activities they will opt for improving the non-traditional side of the business.

Bank Investment (INV)- When banks receive money from deposits, they typically do not loan all to customers. The funds that are not loaned out or saved are used for various forms of investments. This variable is important to the study as these investments represent diversification by commercial banks whereby funds are increasingly being allocated toward activities outside the

realm of traditional banking activities to generate additional forms of revenue i.e. non-interest income.

The macroeconomic factors that led to the diversification of banking practices around the 1980's in developed countries such as the United Sates were discussed earlier. During that period of time, the Trinidad and Tobago banking sector lagged significantly behind the banking sectors of the developed countries in terms of diversification as it remained heavily rooted in intermediation while foreign banks became multi-faceted. It appears however that significant efforts have been made to remedy that situation in recent history as commercial bank investments have risen by a staggering 264% between March 2009 and March 2018 (Central Bank of Trinidad and Tobago 2018). Seeing that these investments are outside of the scope of traditional banking activities, income received from these activities constitute a proportion of non-interest income. Therefore, it is assumed that more bank investments, or more diversification as it may be, will lead to increases in non-interest income. This variable is represented by the industry sum of total bank investments divided by total assets and is expected to have a positive relationship with non-interest income.

Table 2: Showing a summary of the independent variables used for the econometric model and their a-priori expectations.

VARIABLE	EXPECTED RELATIONSHIP (+/-)
Loan to Deposit (LTD)	Negative
Exposure to risk (RISK)	Positive
Bank Liquidity (LIQ)	Positive
Bank Investments (INV)	Positive

EXPLANATION OF INSTRUMENTS

To conduct econometric tests using GMM, instruments are required in addition to independent variables. For this study, the four independent variables

described above were also used as instruments in addition to the following variables:

Inflation (CPI)- This refers to the general increase in prices in an economy over a period of time. There is empirical evidence showing a negative relationship between inflation and banking sector development. One such study was conducted by Boyd et al. (2001) whereby a negative and significant non-linear relationship was found between bank performance and inflation. They posited that there is a rapid decline in bank lending activities as inflation marginally increases leading to fall off in financial sector performance.

The impact of inflation is not limited to decline in lending only as its negative impact on banks' financial performance however as it will limit its involvement in both traditional and non-traditional activities. As inflation lowers the purchasing power of money it affects commercial bank performance in numerous ways, hence its selection as an instrument. Returns from investments become less valuable, operating expenses increase, foreign exchange transactions become less valuable and the uncertainty brought about by inflation can lead to issues with planning and decision making. In addition, there is empirical evidence that shows inflation has an impact on non-performing loans (Rizvi and Khan 2015).

This figure is represented by quarterly percentage figures for inflation.

Interest income (INI)- This refers to the income received by commercial banks from the various types of loans provided to customers and therefore represents the revenue aspect from traditional banking activity. As the largest contributor to banking industry profits, the level of interest income would be a major consideration in decisions on all other banking activities. The availability of funds to a bank from its traditional activities may also influence the level of its engagement in non-interest earning activities (Damankah, Anku-Tsede and Amankwaa 2014).

If banks are receiving insufficient revenue from interest income, then non-interest income will play a significant role in banking operations to compensate

for this shortfall. Equally, if there are large swings in interest income then non-interest income can be used as a stabilizing component to overall banking profits. However, once a bank is making significant and stable revenue from intermediation they may opt out of engaging in non-traditional activities so that its sole focus will be on earning interest income avoiding excessive risk in the process (Boyd, Levine and Smith 2001).

This variable is represented by industry interest income as a percentage of industry gross income.

Table 3: Showing a summary of the instruments used for the econometric model.

INSTRUMENTS
Loan to deposit ratio (LTD)
Exposure to risk (RISK)
Bank liquidity (LIQ)
Bank Investments (INV)
Inflation (CPI)
Interest Income (INI)

ECONOMETRIC MODEL

The econometric model for this study is as follows:

$$NII_t = \beta_0 + \beta_1 LTD_t + \beta_2 LIQ_t + \beta_3 RISK_t + \beta_4 INV_t + \varepsilon_t$$

Before tests were conducted for the study, it was necessary to make certain alterations to the data. These changes were two-fold, firstly, all monthly data

was converted to quarterly data to ensure uniformity and secondly all variables were logged as they were not all represented by the same unit of measure. Logging the variables allows the variables to be tested in the same unit of measure and it also has the advantage of pulling in extreme values, both allowing for better empirical results. Therefore, the econometric model now becomes:

$$LNII_t = \beta_0 + \beta_1 LTD_t + \beta_2 LLIQ_t + \beta_3 LRISK_t + \beta_4 LINV_t + \varepsilon_t$$

EMPERICAL RESULTS AND DISCUSSION OF FINDINGS

GENERALIZED METHOD OF MOMENTS

. For this paper, Ordinary Least Squares (OLS) was initially tried however the limited data available proved an insurmountable challenge when attempting to conduct accurate econometric tests using this model. Tests such as the Johansen Cointegration test and the Vector Error Correction Model (VECM) require longer datasets to provide efficient results. In light of this, generalized method of moments was selected and the motivation behind this choice was the fact that we are unclear of the distribution of the dependent variable. Generalized method of moments or GMM was developed by Hansen (1982) and Hansen & Singleton (1982). GMM can be used for non-linear modelling and is well suited to deal with potential endogeneity issues. The following is a summary of the GMM output generated by EViews. The full EViews output can be found in the appendix.

Table 4: Showing a summary of the results from the GMM.

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*P-value*
Loan to Deposit (LLTD)	0.162811	0.067346	2.417515	0.0215
Exposure to risk (LRISK)	-0.040032	0.042203	-0.94855	0.3500
Bank Liquidity (LLIQ)	0.608292	0.121896	4.990237	0.0000
Bank Investments (LINV)	0.237802	0.043302	5.491763	0.0000

Looking at the P-values from the results we see that the loan to deposit ratio, bank liquidity and bank investments are all significant in predicting non-interest income at the 5% level of significance (α=.05). On the other hand it was seen that exposure to risk is insignificant in predicting non-interest income at all conventional level of significance. We also observe the R-squared figure from the estimation which measures the goodness-of-fit of the model. This figure was .354458 meaning that the independent variables account for 35.4% of all the movements in the dependent variable. The Adjusted R-squared figure, which is preferred due to the shortcomings of the R-squared figure, indicates that LLTD, LRISK, LLIQ and LINV account for 29.39% of the variation in the dependent variable.

Looking at the coefficients from the output we observe the following equation and relationships between the dependent variables and the regressors:

LNII= .162811**LLTD** -.040032**LRISK** + .608292**LLIQ** + .237802**LINV**

The above equation indicates that a 1% increase in LLTD leads to a .16% increase in LNII, a 1% change in LRISK leads to a .04% change in LNII in the opposite direction, a 1% increase in LLIQ leads to a 1% increase in LNII and a 1% change in LINV leads to a 1% change in LNII in the same direction.

The sign of the LTD variable was the most noticeable. Where a negative relationship was expected between LTD and NII we saw a positive one meaning that when more of deposits are converted into loans, non-interest income increases. Using a similar variable, studies by both DeYoung and Rice and Craigwell and Maxwell obtained the appropriate a-priori sign in that high levels of loans corresponds to low levels of non-interest income. However, it must be noted that in the study done in Ghana, a similar result was obtained to this study and they stated that it was possible that interest earning activities and non-interest earning activities were coexisting in the Ghanaian banking system. Seeing that interest income provides a larger share of gross income, it is more likely that poor commercial bank performance stems from poor performance in interest earning activities which will be as a result of higher non-performing loans. Banks anticipate defaults in loans through the use of a provision for impaired loans figure so as to analyse the state of their loans and budget for

anticipated losses (non-performing loans). As commercial banks foresee poor financial performance due to non-performing loans, they would invest more in non-interest earning activities to provide for the anticipated shortfall. Therefore, as more deposits are converted into loans, the increased risk from interest income may cause commercial banks to turn to non-interest income to act as a buffer against potential losses. This, coupled with the fact that increases in both loans and deposits generate additional fee income which naturally increases non-interest income, offers an explanation as to why the variable did not follow a-priori expectations.

Bank liquidity was both significant and carried the appropriate sign, as was the case in the Ghanaian banking system, suggesting that as commercial banks in Trinidad and Tobago become more, liquid, their involvement in non-traditional activities increases. This result bodes well for shareholders and potential investors as it indicates that commercial banks are proactive in seeking out alternative forms of revenue and excess funds do not remain idle. However, commercial banks should use the global financial crises as an example and err on the side of caution with their use of excess liquidity. As we have seen, the mismanagement of excess liquidity has devastating effects on commercial banking performance.

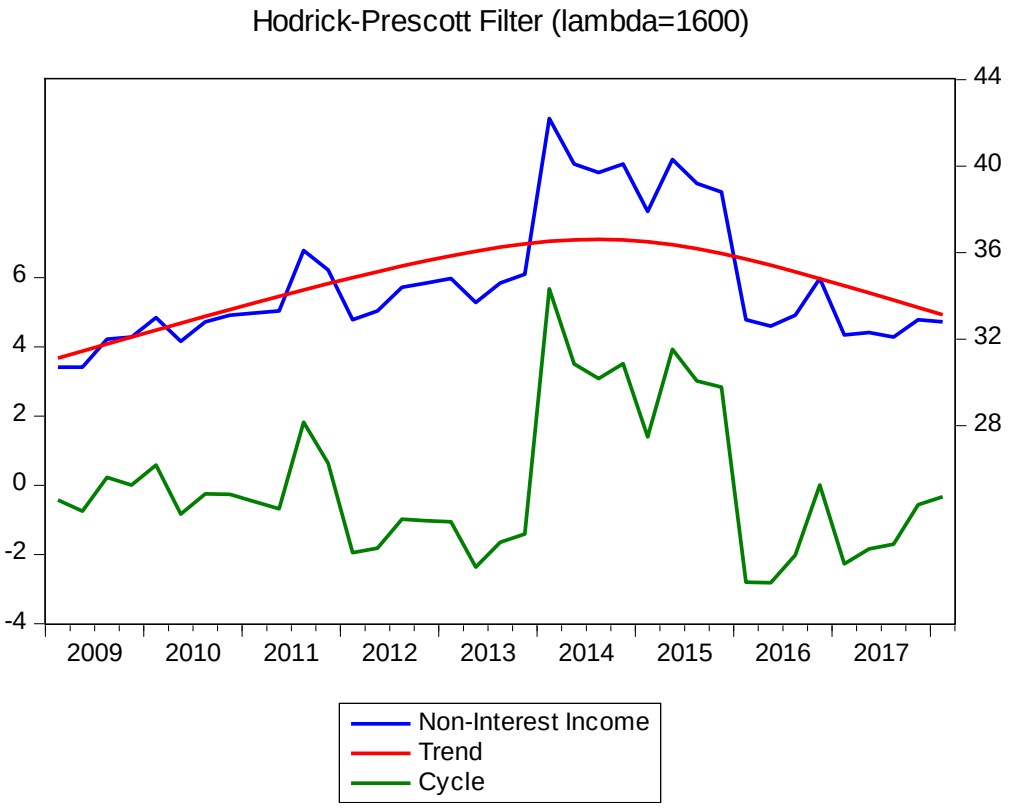
As expected, bank investments were also seen to be a positive and significant variable meaning that as commercial banks increased their investments, the returns from these investments causes the non-interest income proportion of gross income to increase. This was an important result as it indicates that commercial banks are benefitting from increased diversification. This increasingly diversified stream of income reduces the risk faced by commercial banks.

Finally, exposure to risk was negative and insignificant as was the case with Craigwell and Maxwell's study in Barbados which means that risk is not a major factor in generating non-interest income in the banking sector. This was not the case in the studies done in both the United States and Ghana whereby risk was seen as a positive and significant variable in determining non-interest income.

HP Filter

The Hodrick-Prescott Filter (HP Filter) is an econometric tool that is used to separate the trend and cyclical fluctuations of a time series from its raw data. This is used to get a smooth curved representation of a time series which would be more sensitive to long run fluctuations as opposed to short run fluctuations. The following graph represents the HP filter for non-interest income between the first quarter of 2009 to the first quarter of 2018.

Graph 1: HP filter



From looking at graph1 we see that non-interest income's percentage of gross commercial bank income trended upward from 2009 and peaked around 2014 after which it began trending downward until the present time. One must note that during non-interest income's upward trend between 2009 and 2014, the Trinidad and Tobago economy was naturally expanding due to high oil prices. As a country heavily dependent on oil revenue, the Trinidad and Tobago economy fluctuates with the price of oil. In fact, Trinidad and Tobago benefitted significantly from an oil price of around USD$103 per barrel in June 2014 (Central Bank of Trinidad and Tobago 2018).

During the downward trend in non-interest income, the Trinidad and Tobago economy was also contracting due to falling oil prices due to the increased discovery of shale oil. The country's economy was severely impacted by oil prices as low as USD$48.50 in March 2015 (Central Bank of Trinidad and Tobago 2018).

These trends indicate that returns from these activities are tied to the financial health of the economy. One may assume that as the economy goes through turbulent times, individuals are less likely to demand services from commercial banks thereby decreasing opportunities for the banks to extract certain fees and service charges. The aforementioned trends may also indicate a relationship between the bank's decisions to engage in non-interest income earning activities and the state of the economy. During uncertain economic times, banks may see the need to revert to more traditional forms of business as opposed to the perceived riskier non-traditional forms of business.

CONCLUSION

This paper analysed some of the key factors surrounding commercial banks decision to engage in non-traditional activities. These factors are carefully considered by commercial banks as the vast potential of non-traditional activities have been recognised over the years. Accounting for up to 42.2% of gross income in the past we have seen that non-interest income has an enormous impact on the financial health of commercial banks in this country in terms of both a supplement and an alternative to interest income. While it is true that loans are regarded as the most profitable service offered by commercial banks, it is also the riskiest therefore the importance of non-interest income cannot be downplayed.

Using the HP filter we see that non-traditional activities are heavily tied to the financial health of the overall economy. However, it is unclear whether the link between non-interest income and the state of the economy was due to voluntary or involuntary actions taken by commercial banks. In addition, through the use of GMM, the loan to deposit ratio which shows how invested commercial banks are in intermediation, bank liquidity and bank investments were all seen as driving factors in movements in non-interest income, whereby exposure to risk was shown to have no impact on non-interest income. While both bank liquidity and bank investments carried the appropriate a-priori signs, interestingly enough, the loan to deposit ratio actually moved in the same direction as non-interest income when a negative relationship was expected. This result indicates that traditional and non-traditional activities are coexisting in the Trinidad and Tobago commercial banking system.

RECOMMENDATIONS AND LIMITATIONS

While this topic was very interesting, this study came with a few limitations. The main limitation was the inaccessibility of data. While there was a plethora of data available on the central bank website, most of the banking industry specific variables were only available in a yearly breakdown between 2003 and 2016. As this would not have offered enough datapoints to run sufficient econometric model, different assumptions had to be made with the data that was available.

For further study on this topic, obtaining more specific data and longer datasets will be key in uncovering the true driving forces in banks' decision to increase or decrease involvement in non-traditional activities. In addition, it was a challenge sourcing studies that took similar econometric approaches as this study both in the region or otherwise. The short timeframe within which the study was to be completed also proved to be problematic as it only allowed for research on the industry as well as only one aspect of non-interest income. For further study, it is recommended that the specific factors surrounding each individual commercial bank be observed and compared as well as the impact of non-interest income on commercial banking performance in terms of both profitability and volatility of income.

APPENDIX

Variable definitions

Independent Variable	***Definition***
LTD	Loan to deposit ratio- Customer loans as a percentage of customer deposits
RISK	Exposure to risk- Non-performing loans as a percentage of gross loans
LIQ	Bank liquidity- Current assets as a percentage of total assets
INV	Bank investments- Commercial bank investments as a percentage of total assets
Instruments	***Definition***
INI	Interest income- Interest income as a percentage of gross income
CPI	Inflation
LTD	See definition above
RISK	See definition above

LIQ	See definition above
INV	See definition above

Summary of a-priori expectations and regression results

Variable	*A-priori relationship with NII*	*Observed relationship with NII*	*Result*
LTD	Negative	Positive	Significant
RISK	Positive	Negative	Insignificant
LIQ	Positive	Positive	Significant
INV	Positive	Positive	Significant

Table 1: Comparison of non-interest income and GDP growth and the growth rate of total assets

Date	Non-interest Income-to-Gross Income (%)	GDP GROWTH	GROWTH RATE OF TOTAL ASSETS
Dec-2017	32.9	-1.2	0.377955524
Sep-2017	32.1	2.7	-0.239674977
Jun-2017	32.3	-3.5	-0.703806359
Mar-2017	32.2	-6	-0.554152536
Dec-2016	34.8	-6.8	2.566569471
Sep-2016	33.1	-11.9	-1.165197674
Jun-2016	32.6	-8.2	0.405396473

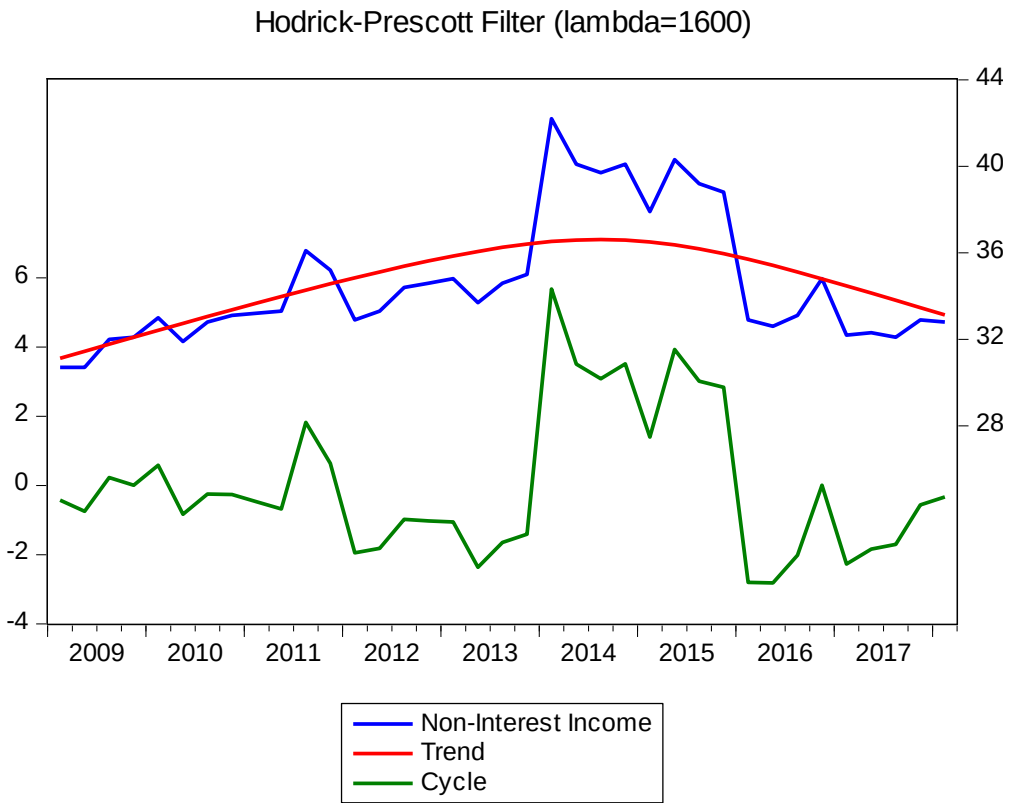
Mar-2016	32.9	-5.3	1.020120486
Dec-2015	38.8	-1.4	-1.316386745
Sep-2015	39.2	-1.6	1.990740741
Jun-2015	40.3	-2.6	1.003092239
Mar-2015	37.9	-1.6	-0.799054303
Dec-2014	40.1	-0.2	3.646204907
Sep-2014	39.7	2.2	0.23240088
Jun-2014	40.1	3.1	-0.475602899
Mar-2014	42.2	0.9	1.769165965
Dec-2013	35	3.3	0.593333491
Sep-2013	34.6	1.9	1.883557509
Jun-2013	33.7	4.7	0.860578211
Mar-2013	34.8	4.9	2.24116607
Dec-2012	34.6	0.8	4.436738763
Sep-2012	34.4	1.9	3.143804934
Jun-2012	33.3	-2.1	0.516788898
Mar-2012	32.9	1.4	0.168351684
Dec-2011	35.2	0	2.154799787
Sep-2011	36.1	-0.5	4.29719723
Jun-2011	33.3	1.6	0.662366754
Mar-2011	33.2	-3.6	0.12151137
Dec-2010	33.1	-0.5	2.572878439
Sep-2010	32.8	1.8	-1.60786413
Jun-2010	31.9	-0.2	0.110102112
Mar-2010	33	2	-1.301149204
Dec-2009	32.1	0.8	8.912871797
Sep-2009	32	-6.2	3.751107054
Jun-2009	30.7	-3.3	1.235305378
Mar-2009	30.7	-4.8	3.209698241

Summary of the consolidated commercial bank statement of income for 2016 showing a breakdown of the composition of interest income and non-interest income.

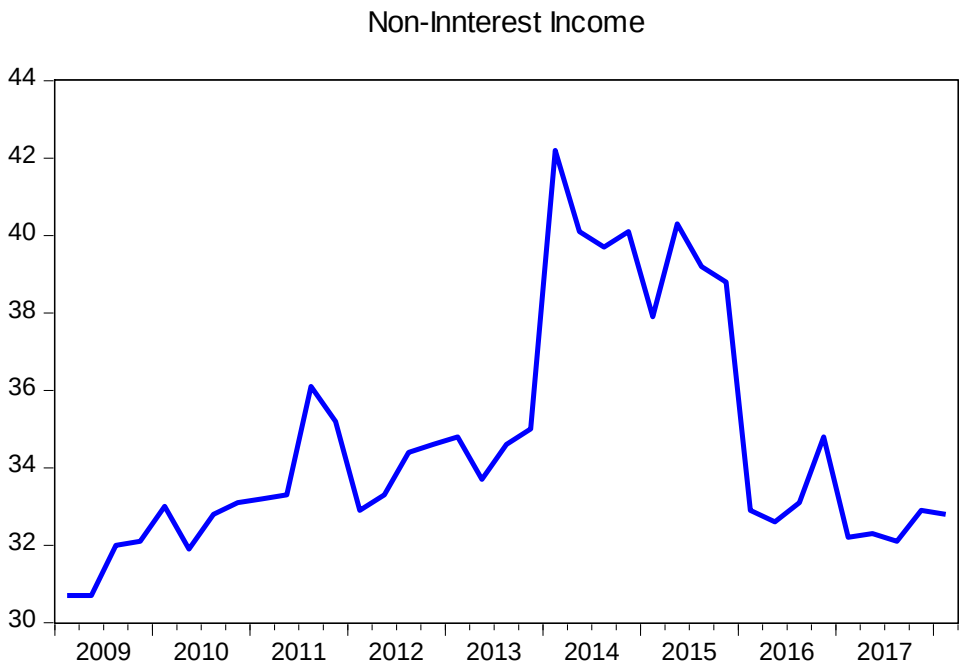
	2016
OPERATING INCOME	
INTEREST INCOME	**5,313,859**
Due from Banks	17,324
Inter-Bank Funds Sold	7,004
Total Investments	703,568
Total Loans	4,529,810
Other	56,153
FEE INCOME	**1,395,697**
Loans	307,895
Customers' Liability on Acceptances	20,957
Loan/Lease Commitments	28,011
Service Fees	925,972
Deposit Accounts	238,684
Commissions from Foreign Exchange Transactions (Net)	28,425
Securities Brokerage	3,462
Rental of Safety Deposit Boxes	5,741
Other	649,660
Other	112,862
DIVIDEND INCOME	**12,313**
RENTAL INCOME	**540**
FOREIGN EXCHANGE PROFIT/(LOSS)	**841,232**
TRUSTEE SERVICES	**159,565**
OTHER INCOME	**194,221**

TOTAL OPERATING INCOME	**7,917,427**

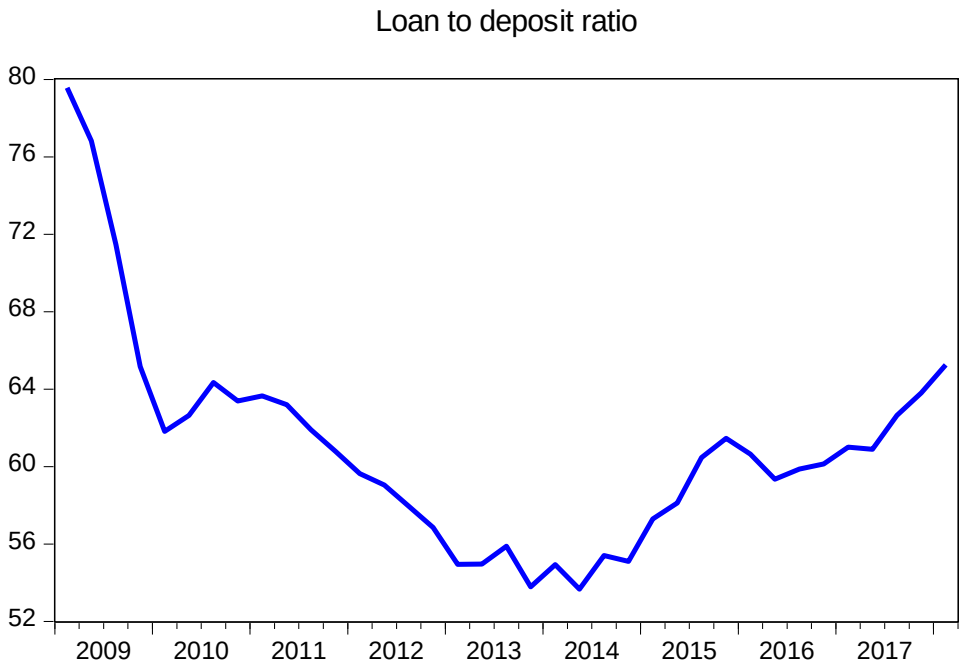
Graph 1: HP Filter



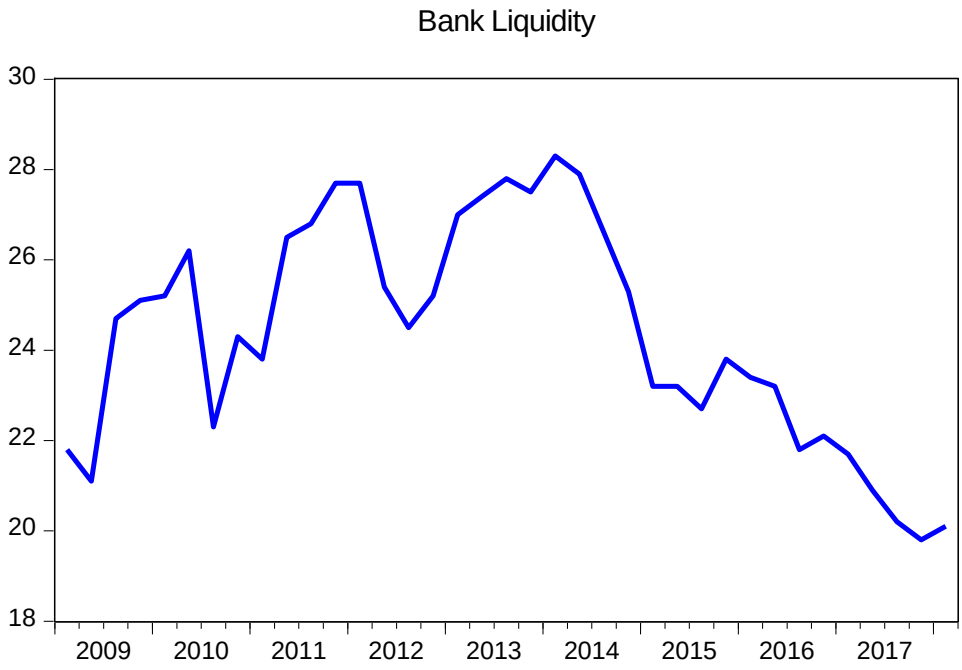
Graph 2: Non-interest income



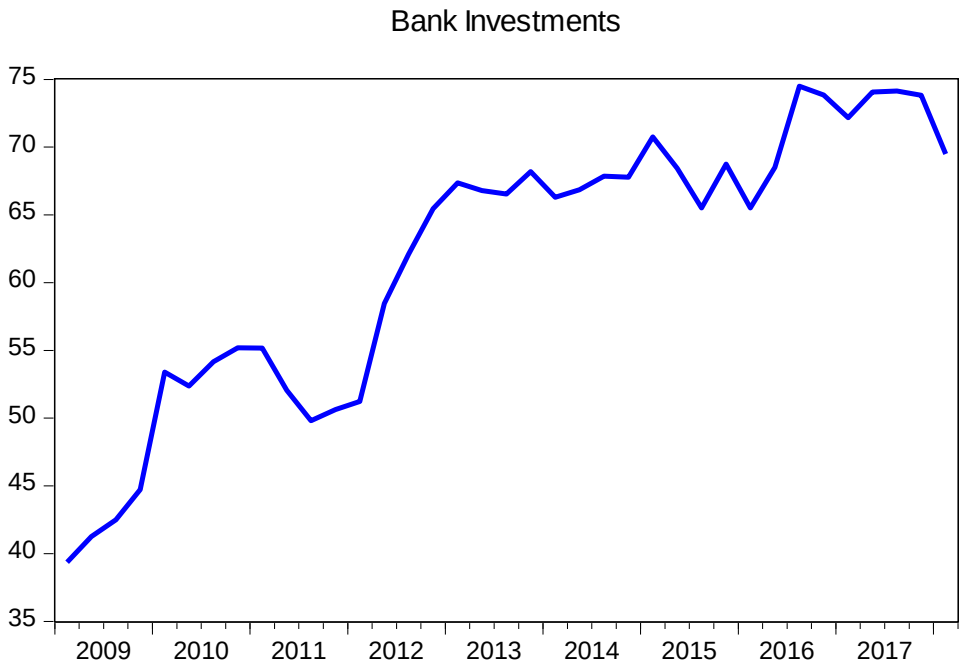
Graph 3: Loan to deposit ratio



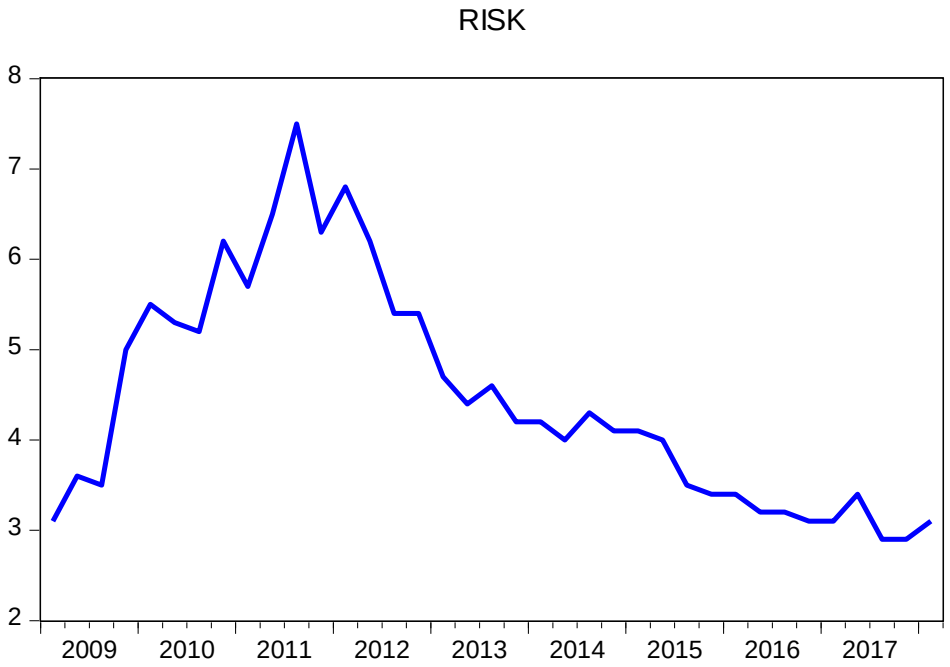
Graph 4: Bank liquidity



Graph 5: Bank Investments



Graph 6: Exposure to risk



GMM Output from Eviews

Dependent Variable: LNII
Method: Generalized Method of Moments
Date: 08/11/18 Time: 15:42
Sample (adjusted): 3/01/2009 12/01/2017
Included observations: 36 after adjustments
Linear estimation with 1 weight update
Estimation weighting matrix: HAC (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)
Standard errors & covariance computed using estimation weighting matrix
Instrument specification: LLIQ LLTD LRISK LINV LINI LCPI
Constant added to instrument list

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LLIQ	0.608292	0.121896	4.990237	0.0000
LLTD	0.162811	0.067346	2.417515	0.0215
LRISK	-0.040032	0.042203	-0.948550	0.3500
LINV	0.237802	0.043302	5.491763	0.0000

R-squared	0.354458	Mean dependent var	3.542670
Adjusted R-squared	0.293939	S.D. dependent var	0.084916

S.E. of regression	0.071352	Sum squared resid	0.162918
Durbin-Watson stat	0.706591	J-statistic	4.815015
Instrument rank	7	Prob(J-statistic)	0.185855

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