CBB Working Paper 2010-…..

AN ASSESSMENT OF THE IMPACT OF THE SECTORAL DISTRIBUTION OF COMMERCIAL BANK CREDIT ON ECONOMIC GROWTH AND DEVELOPMENT IN TRINIDAD AND TOBAGO

BY

AVINASH RAMLOGAN AND TANISHA MITCHELL-RYAN

CENTRAL BANK OF BARBADOS
Research Department

CENTRAL BANK OF TRINIDAD & TOBAGO

Working Paper

"AN ASSESSMENT OF THE IMPACT OF THE SECTORAL DISTRIBUTION OF COMMERCIAL BANK CREDIT ON ECONOMIC GROWTH AND DEVELOPMENT IN TRINIDAD AND TOBAGO"

Prepared by
Avinash Ramlogan
Tanisha Mitchell-Ryan
Daryl Cheong[1]

September 2009

Abstract

In Trinidad and Tobago, commercial bank credit plays an important role in the way in which businesses and individuals finance economic transactions. This paper attempts to assess the impact of commercial bank credit on economic development. The paper draws heavily from the credit channel of the monetary transmission mechanisms, which states that credit influences economic growth through its impact on capital investment. It employs a vector error correction model to firstly assess the relationship between credit and investment, and secondly to determine the casual directionality of the relationship (if any). The model found that overall, credit and growth tends to demonstrate a 'demand following' relationship. However, further analysis revealed a 'supply leading' relationship between credit and growth within key sectors of the non-oil economy. These findings can have important implications for monetary policy and its impact on economic development.

[1] The authors are Economists in the Research and Policy Department of the Central Bank of Trinidad and Tobago. Views expressed are those of the authors and do not necessarily reflect those of the Central Bank.

Introduction

In many industrialized and emerging countries credit plays an integral role in economic growth and development. Bernanke and Gertler (1995) identified the credit channel as one of the key channels through which monetary policy impacts on capital investment and ultimately growth. In Trinidad and Tobago, domestic credit is an important component of the economy. As a percentage of GDP, total domestic credit increased from an average of 25.5 per cent during the 1970s to 38 per cent in the 1980s before falling off slightly to 37.6 per cent in the 1990s and 33.9 per cent during the period 2000 – 2008. Further, over the past ten years, private sector credit granted by commercial banks accounted for an average 71.3 per cent of overall private sector credit granted by deposit taking institutions[2]. Given the importance of commercial banks as financial intermediaries in Trinidad and Tobago, it is imperative from a policy stand point to have an understanding of the impact of bank credit on economic growth.

A central bank is also interested in the direction of causality between credit and economic growth. If by stimulating credit the central bank can influence growth then monetary policy through the credit channel can play a significant role in economic development. However, if the relationship is the reverse and credit does not stimulate growth, but growth influences credit then monetary policy may have to provide a stimulus via another channel. This paper assesses the impact of commercial bank credit on economic growth. Further, it attempts to identify the sectors that account for the largest proportion of credit and to assess the impact of credit on growth within these sectors. To do so, the paper employs a vector error correction model (VECM) to test for a causality relationship between credit and growth. If a relationship exists, the model will also be used to establish the direction of the causality. Using the same framework an examination of the relationship between credit and growth in some of the main sectors of the non-oil economy will be further analysed.

Although, the relationship between credit and growth has been well documented in both international and domestic literature, this paper seeks to add to the research by examining the relationships within individual sectors. This is of value to a policy maker since it will identify

[2] Deposit Taking Institutions include Commercial Banks, Trust and Mortgage Finance Companies and Finance Companies and Merchant Banks.

which sectors are most efficient in their use of credit. With this knowledge, policy makers can target these sectors and attempt to ensure that they have ready access to commercial bank credit.

The remainder of this paper is divided into six sections. The second section discusses some of the literature pertaining to the link between credit and growth. The third section analyzes the sectoral decomposition of commercial bank credit, while the fourth section presents a simple analysis between economic growth and credit. The fifth section develops the methodology and data sets used to formally test for the causality and the direction of causality between credit and growth. The following section analyses the results from the models and finally we conclude.

Literature Review

Bernanke and Gertler (1995) stated that the credit channel of monetary policy is supposed to manifest itself through bank lending and balance sheet channels. The bank lending channel is based on the assumption that tighter monetary policy would reduce the money supply therefore deposits are expected to fall. A fall in deposits should dampen bank loans especially to individuals leading to lower investment spending and ultimately to lower aggregate demand. Conversely, an expansionary policy stance should increase the money supply leading to higher investment spending and increased economic activity. The bank lending channel as proposed by Bernanke and Gertler can be represented as:

Monetary Policy → Bank Deposits → Bank Loans → Investment → Income

Birchwood and Nicholls (1999) emphasize that commercial banks in the English speaking Caribbean play a crucial role in the generation and distribution of domestic savings. The paper also highlights the importance of the credit transmission mechanism as they indicate that it is the pass-through from savings to investment, which tends to be the main driver of economic development. As a result attention must be paid to the allocation of domestic savings to productive investments. The methodology utilized by Birchwood and Nicholls involved the use of a bivariate causal model in order to determine causality between credit and productive investment. The causal relationship is analyzed in the framework of a Vector Error Correction Model (VECM), specified as:

$$\Delta^{*}(L)\Delta Z_t = \alpha\beta' Z_{t-1} + \varepsilon_t$$

The paper concluded that some relationship exists between credit and economic cycles. They discovered that the amount of non-consumer loans tended to move counter cyclical. Moreover a long run relationship was established between credit and investment and the researchers determined that the relationship was "demand following", as a result the supply of credit, in the long run, is constrained by investment. However, in the short run bi-directional causality was established between commercial banks business loans and economic growth which suggested that commercial bank credit is both supply leading and demand following.

In the paper by Gaurisankar (1998), he assessed whether, in the case of Suriname, domestic private credit played a vital function in the realization of real economic growth. Moreover the paper attempted to develop a standard measurement for the amount of private sector credit needed to realize economic growth. The measure was expected to inform monetary policy and influence economic growth. Additionally the author analyzed the correlation between real credit to the private sector and real economic growth.

The correlation matrix showed that the correlation coefficient between private sector credit and real GDP growth is 0.70. The author indicated that this correlation was considered low, but in light of net capital flow, i.e. foreign investment, loans and grants, it is understandable. The correlation coefficient revealed that during the period under study, private sector credit had a stronger correlation with real GDP than credit to the government. The paper concluded that "from a domestic credit point of view the private sector indeed plays a much more significant role than the government in generating economic growth."

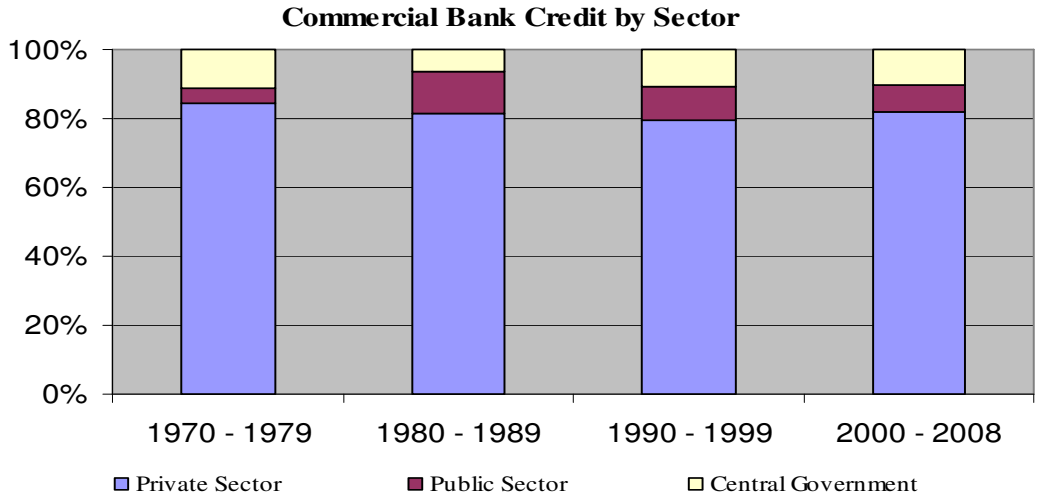
Bynoe, Howard and Moore (2008) attempted to identify the determinants of credit booms in the Caribbean and to establish whether or not those credit booms led to sustained economic growth in the region. The authors utilized panel data to establish the main causes of credit booms in the region. They identified three key groups of variables that made some contribution to the development of credit booms; macroeconomic developments, macroeconomic policy and external shocks. In the case of the Caribbean, it was established that macroeconomic developments were one of the main contributors to credit booms. The authors established that loose monetary policy and liberalization of the capital account play a significant role in the development of credit booms. More importantly, the authors concluded that credit booms can be

detrimental to an economy, particularly when such booms finance high risk investments. They note that, while a "vibrant financial system can have a positive impact on long run economic growth" it is important to distinguish between a vibrant system and a credit boom which can be detrimental to the growth of an economy.

Sector Decomposition of Commercial Bank Credit

Credit is popularly defined as loans and advances plus securities and other investments. The three major categories of commercial bank credit are private sector credit, public sector credit and central government credit. The private sector includes businesses and consumers, while the public sector comprises of local government, statutory boards, state owned financial institutions and non-financial institutions. Private sector credit is by far the largest component of commercial bank credit, over the period 1970 – 2008 it has accounted for on average 81.7 per cent per year of total credit. Meanwhile over the same period, the other components – public sector credit and central government credit – accounted for on average 8.8 per cent and 9.6 per cent of total commercial bank credit, respectively (see Chart 1).

Chart 1



Being the largest component of bank credit, this study focuses primarily on private sector credit. There are two reasons for this, firstly from a policy perspective we are more interested in the aspects of growth that is not related to the government. Keynesian economists have long since established that fiscal policy can provide a stimulus to growth. There is no need to add to this

literature. Also, government can provide a stimulus independent of bank credit, in fact in Trinidad and Tobago a large portion of debt issued by the central government and statutory boards are taken up by insurance companies, pension funds and savings institutions. In addition, when times are good, the government can also finance projects from revenues. The fact that private sector credit is the largest component of total domestic credit also justifies our focus.

Private sector credit can be broken down into two broad categories: businesses and consumers. Traditionally businesses have accounted for the lion-share of bank lending. Over the period 1970 – 2008, business credit has accounted for on average 61 per cent of total lending. However, there was a notable decrease in business lending as a portion of total lending in the 1990s and 2000s. During 1970 – 1989, business credit to total private sector credit averaged 64.3 per cent per annum, whilst in the latter period 1990 – 2008 it averaged 57.6 per cent per annum. Birchwood and Nicholls (1998) observed a trend between the proportion of business and consumer credit and the business cycle. They noted that during an economic downturn, the proportion of business credit to total lending increased, whereas during an economic upturn the ratio of consumer credit to total lending increased.

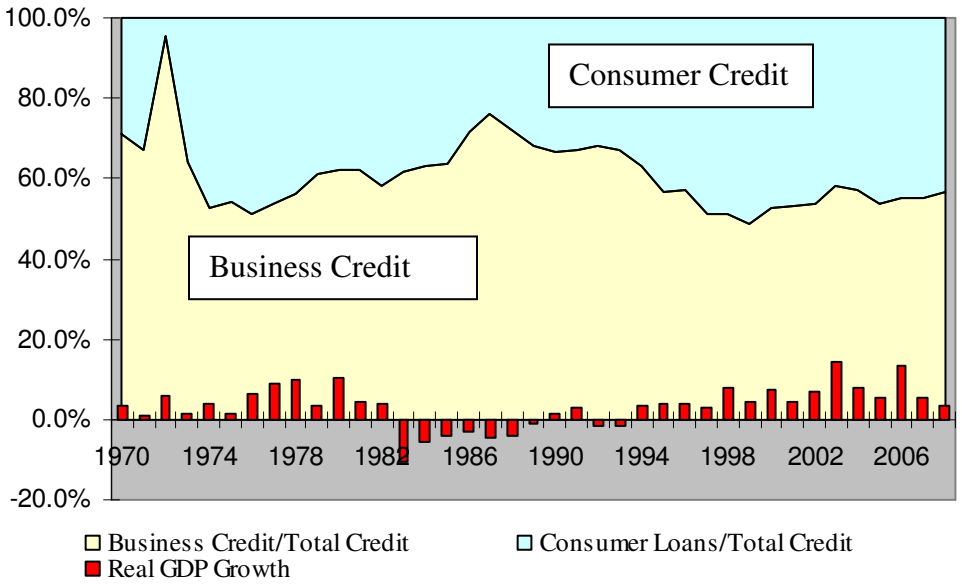
From the chart below, it can clearly be seen that during the boom period of the 1970s consumer credit share of total credit rose, while during the economic recession of the 1980s it declined. In the mid to late 1990s and so far in the 2000s the economic resurgence has once again led to an increase in the proportion of consumer credit to total credit. Birchwood and Nicholls (1999) put forward two reasons for this phenomenon. Firstly, the moral hazard problem is higher for individuals than businesses and higher in a recession than in a boom for both classes of customers. Therefore, in a recession banks attempt to minimize the moral hazard problem by granting less credit to individuals. Secondly, in an economic upturn when the moral hazard risk is lower, banks tend to prefer lending to consumers because in general consumer loans attract higher interest rates than business loans.

The slowdown in credit in 2009 presents an alternative hypothesis. Recent experience suggests that while banks have tightened lending criteria, they are still willing to lend to suitable customers, however consumers themselves have been less inclined to borrow. Therefore

consumers' unwillingness to borrow in times of economic slowdown maybe another reason for the fall off in consumer loans to total credit during such periods.

Chart 2

Sectoral Credit and GDP Growth



Business credit can be further decomposed by sector. The following chart shows the sectoral decomposition of commercial bank credit over the period 1970 – 2008. In terms of credit allocation, the manufacturing and distributive trade sectors were the dominant sectors for most of the review period. The manufacturing sector's share of total business credit averaged 25.5 per cent per year over the 38 year period. As a per cent of total business credit, manufacturing share fell off slightly in the late 1970s and early 1980s before rebounding strongly in the late 1980s and 1990s. Over the period 1970 to 1999, credit to the manufacturing sector accounted for 28.2 per cent of total business credit. However, there has been a sharp fall off in the share of total business credit commanded by the manufacturing sector in the 2000s. In the period 2000 – 2008, manufacturing accounted for only 17.9 per cent of total business credit.

Like the manufacturing sector, the distributive trade sector accounted for a large portion of business credit in the 1970s and 1980s. Its significance began to wane in the late 1990s and 2000s. Over the entire period, the distributive trade sector made up 21.4 per cent to total business loans, while in the period 2000 – 2008 it accounted for 13.7 per cent. The construction sector embarked on a credit boom during the period 1979 – 1986, representing 16.5 per cent of

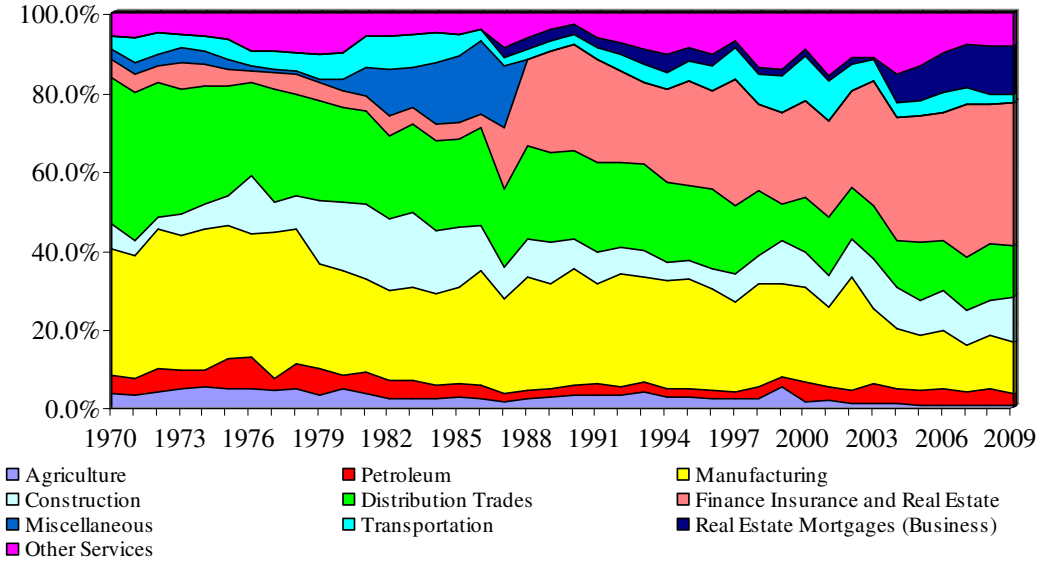
total business credit. The sharp growth in construction credit was not sustained beyond this period, as its share of business lending fell off markedly. However since then, its share of total business credit has remained relatively constant at its long run average of 9.7 per cent.

In 1987 there was a change in the manner in which private sector credit data was presented in the Central Bank's statistical publications. Prior to 1987, the financial sector was represented by the classification 'private financial institutions'. As represented by this classification the financial system accounted for a very small portion of total business credit (4.4 per cent). After the change in 1987, the financial sector was represented by the classification 'finance, insurance and real estate'. This resulted in a sharp increase in the financial sector's share of business credit (27.1 per cent). The reclassification in 1987 also resulted in the reclassification of the miscellaneous category into now identifiable categories. It is assumed that a large portion of the miscellaneous category was now classified into the financial sector. However, the exact values cannot be easily determined. Due to this problem empirical testing was not conducted on the financial sector. The reclassification in 1987 had no impact on the total value of business loans or on the other categories such as manufacturing, distribution, construction, agriculture and petroleum.

The petroleum and agriculture sectors have historically accounted for the lowest share of business credit. Over the period 1970 – 2008, agriculture and petroleum sectors have accounted from 2.7 per cent and 3.8 per cent, respectively of total business credit. There are several reasons for the lack of credit channelled to the petroleum and agricultural sectors. Trinidad and Tobago's petroleum sector is dominated by large multi-national energy companies who access their funding through the international credit markets. Due to superior credit ratings, these companies are able to access foreign currency loans at cheaper rates than Trinidad and Tobago's commercial banks. In addition, the size of loan required by energy companies cannot be easily accommodated by local commercial banks. In regards to agriculture, the Agricultural Development Bank (ADB) was specially established to lend to this sector. As a result, the ADB may be more willing to lend to farmers than commercial banks and because it is subsidized by the government it is able to offer cheaper rates. Therefore, farmers may seek ADB financing before going to a commercial bank. Also, the agriculture sector may be perceived as risky business by local commercial banks.

Chart 3

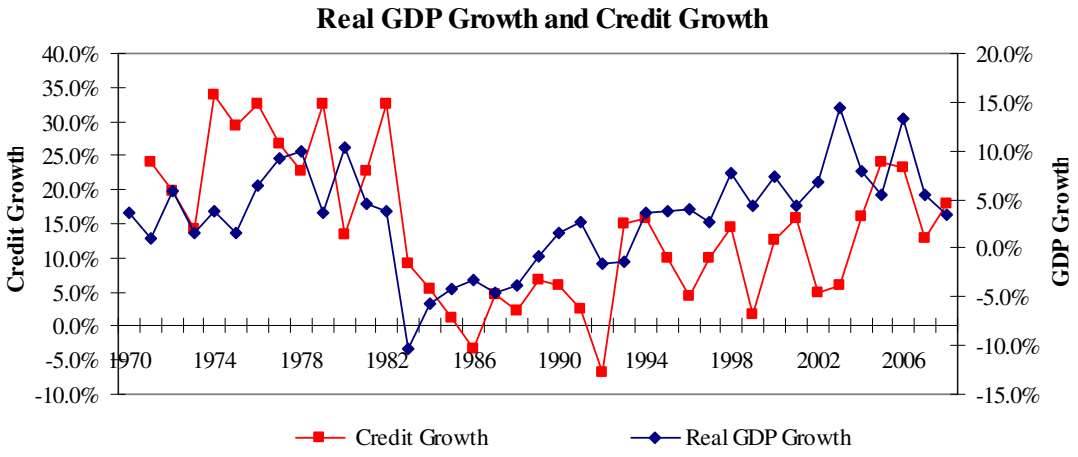
Sector Decomposition of Business Credit



Sectoral Distribution of Credit and Economic Growth – Preliminary Findings

With the manufacturing, distribution, construction and the finance, insurance and real estate sectors accounting for the largest share of business credit, the pertinent question is how successful have these sectors been in channelling credit into growth. Before we explore the individual sectors, it may be useful to examine the relationship between overall private sector credit growth and economic growth. Chart 4 plots real GDP growth and private sector credit growth. The correlation between the two variables is 0.4, which suggest that there is a positive but relatively weak linear relationship between the variables. That is, when private sector credit increases GDP growth also increases and when credit growth slows or contracts GDP growth declines, but the extent of the relationship is not strong.

Chart 4



Using a correlation matrix we analyze the relationship between credit granted to individual sectors and the respective economic performance. The correlation matrix gives the magnitude and trend of some linear relationship between two variables.

Table 1

Correlation Matrix of Business Sector Credit and Sectoral Growth Rates

Growth rate/ Business Sector credit	*Credit to Agriculture*	*Credit to Petroleum*	*Credit to Manufacturing*	*Credit to Construction*	*Credit to Distribution*
G .Agriculture	-0.007089	-	-	-	-
G. Petroleum	-	-0.038356	-	-	-
G.Manufacturing	-	-	0.250121	-	-
G.Construction	-	-	-	0.248267	-
G.Distribution	-	-	-	-	0.051958

Table 1 looks at the correlation between GDP growth in chosen sectors in relation to the credit in those sectors. *A priori* one would expect a positive relationship between credit and GDP growth. Over the period, the relationship between manufacturing credit and manufacturing GDP and construction credit to construction credit to construction GDP were both 0.25, suggesting a positive but somewhat weak relationship among the variables.

The relationship between business credit to agriculture and growth in agriculture GDP displayed an anomaly as the correlation between these variables was negative; although the overall relationship was weak -0.7 per cent. Over the past eight years the growth in agricultural sector has been either slow or negative. Within the recent past, agricultural output was negatively impacted by closure of Caroni 1975 Ltd in 2003 and the restructuring of the Sugar Manufacturing Company Ltd in 2007. Moreover, the agricultural industry is subjected to a host other influences apart from business credit, such as flooding, pests and praedial larceny. Even though lending to agriculture grew in many periods the existence of these influences may have led to the decline in GDP growth in agriculture, leading to the negative relationship between the variables. The second anomaly was the negative, albeit weak correlation coefficient between petroleum GDP and credit. However, this was not unexpected as the majority of energy companies source their funding from international financial markets.

While the analysis points to a positive relationship between growth and credit in the main sectors, it is simplistic and leaves many questions unanswered. To analyze the impact of credit on growth we need to establish causation. It is well known that correlation does not necessarily imply causation. Further, once causation is established it is imperative to know the direction of the causality – Nicholls and Birchwood (1999) refer to the terms 'demand following' or 'supply leading'. Furthermore, the relationship between credit and growth is not complete. The credit channel of the monetary transmission mechanism proposes that credit influences GDP growth through investments (Mishkin (1995), Bernanke and Gertler (1995)). Therefore, credit must first have an impact on investments which would then influence economic growth.

Methodology and Data

This section of the paper empirically analyses the dynamic impact of private sector business credit on economic growth in Trinidad and Tobago over the period 1970-2008. Drawing from the credit channel of the monetary transmission mechanism, the paper employs a vector error correction model (VECM) to test for causality between credit and investment. The fact that investment is a component of GDP[3], it is assumed that if credit influences investment it will indirectly impact on GDP. The relationship between investment and GDP is well established in economic literature and will not be tested here. The paper focuses on the first relation in the

[3] Income = Consumption + Investment + Government Spending + Net exports

schematic, that is, the relationship between credit and gross capital formation, which is used as a proxy for investment. The VECM will allow for the testing of the both the long-run and short-run relationships between the two variables under consideration. This modelling approach is similar to that adopted by Nicholls and Birchwood (1998).

The model proposed can be expressed in VAR format as follows:

$$X_t = \sum_{i=1}^{k} A_1 X_{t-i} + E_t$$

Where X_t represents a vector of all the current values in the model, A_1 is the matrix of coefficients to be estimated in the model, and E is the vector of error terms. As a starting point, the individual data series are tested for stationarity using the Augmented Dickey Fuller (ADF) test. The next step involves testing for cointegrating relationships within the model. According to the Granger representation theorem, once cointegration is established Granger causality can be assumed. The Johansen method is used to test for cointegrating relationships within the VECM framework using the trace statistic and maximum eigenvalue test statistic. In testing for cointegration it is assumed that the series has an intercept term, but no trend term. This differs from Nicholls and Birchwood (1999) who assumed that there are neither intercept or trend terms. However, this assumption is only valid if it is certain that all the series have zero mean[4]. Once established, the cointegrating transformation of the unrestricted VAR can be written in the form of a VECM as follows:

$$\Delta X_t = a_{\perp}\lambda_1 + \Gamma_1 \Delta X_{t-1} + \Pi X_{t-k} + E_t$$

For the purpose of this study, the VECM is applied as:

$$\Delta \mathrm{I}_t = \alpha_1 \left(I_{t-1} - \beta C_{t-1} + \phi_a \right) + \delta_1 \Delta I_{t-1} + \rho_1 \Delta C_{t-1} + u_{1t}$$

$$\Delta C_t = \alpha_2 \left(I_{t-1} - \beta C_{t-1} + \phi_b \right) + \delta_2 \Delta\ C_{t-1} + \rho_2 \Delta I_{t-1} + u_{2t}$$

where u_{1t} and u_{2t} are white noise processes; *I* represents the real variable investment/GCF while the *C* represents the financial variable, private sector credit, used. The coefficients on the error correcting terms are denoted as α_1 and α_2, respectively.

[4] Quantitative Micro Software LLC.

The interpretation of the VECM involves determining the statistical significance of α_1 and α_2. If α_1 is found to be significant then we can assume that shocks in C_t "Granger-cause" changes in I_t in the long run. Therefore, if α_1 is significant we can say that credit is 'supply leading', in that credit influences investment and indirectly impacts on growth. However, if α_1 is not statistically significant then the long-term shocks in C_t have no impact on the current changes in I_t. On the other hand, if α_2 is significant it would suggest that long-term shocks in I_t, "Granger-cause" the current value of C_t. This would support a 'demand leading' argument, where the existence of growth and investment spurs credit demand. If both α_1 and α_2 are significant then this may suggest a bi-directional causality. Further, if the parameters δ_{1i}, ρ_{1i}, δ_{2i} and ρ_{2i} are significant, then a short-term relationship exists between the variables in the model.

After gaining an understanding the causality between credit and investment, the short-term dynamics between the variables are conducted using the impulse response function. The impulse response function is formulated as follows:

$$X_t = \sum_{i=0}^{10} \omega_i e_{t-i}$$

where ω is 2 x 2 matrix of impulse response function and e is a 2 x 1 vector of othogonalized innovations derived from the Cholesky decomposition of the error terms.

The models use annual data spanning the period 1970 – 2008. First, using the VECM framework outlined above we model private sector business credit (excluding the energy sector) and non-oil gross capital formation. This is done to establish an overall relationship between business credit and investment. To further the analysis, we separately model different components of private sector business credit and the relevant gross capital formation. These models also employ the same VECM framework specified above. The four main components of business credit were analyzed; these are the manufacturing sector, distributive trade sector, construction sector and finance, insurance and real estate sector. However, given the statistical inconsistencies with the financial sector credit data before and after the reclassification in 1987 no empirical testing is conducted on this sector. Therefore the three separate models include data on manufacturing

credit and manufacturing gross capital formation, distributive trade credit and distributive trade gross capital formation and construction credit and its associated gross capital formation.

All variables are expressed in the logarithmic transformation of its nominal term. Private sector credit data was sourced from the Central Bank's Handbook of Key Economic and Financial Statistics and the Statistical Digest. Non-oil gross capital formation was used as a measure of non-oil investment and was extracted from the national income accounts tables of Trinidad and Tobago.

Results

The framework for analyzing the results of each of the four models followed three main steps. Firstly, causality in the long run was tested via cointegration analysis. Secondly, the significance of the alphas was determined and the direction of causality. Thirdly, we analyze short run dynamics by looking at the impulse response functions. Tables 2 and 3 reproduce the results of the models. For the first model, which looks at the relationship between overall business credit (LBUSC) and non-oil gross capital formation (LGCF), the Trace Statistic indicates that at a 10 per cent significance level there is one cointegrating relationship between these two variables. This suggests that there is causality among the variables. The next step involves identifying its direction. To do this we test the significance of α_1 and α_2. The null hypothesis and the decision criteria are as follows:

H_0: $\alpha_1 = 0$

H_1: $\alpha_1 \neq 0$

If t-stat > Critical Value at 10 per cent significance: reject the null hypothesis

If t-stat < Critical Value at 10 per cent significance: do not reject the null hypothesis

Table 3 shows that the associated t-stat for α_1 is 0.2369, and at a 10 per cent level of significance the respective critical value is 1.687. Therefore, we cannot reject the null hypothesis that α_1 is insignificant. Next we test for the significance of α_2, using the same criteria.

H_0: $\alpha_2 = 0$

H_1: $\alpha_2 \neq 0$

If t-stat > Critical Value at 10 per cent significance: reject the null hypothesis

If t-stat < Critical Value at 10 per cent significance: do not reject the null hypothesis

Here, the relevant t-stat for α_2 is 2.752. Given that the critical value at the 10 per cent significance level is 1.687 we reject the null hypothesis that α_2 is insignificant. The significance of α_2 means that gross capital formation Granger causes business credit and therefore the relationship is 'demand following'.

Given the findings of the initial model, it may also be instrumental to evaluate the dynamic between credit and capital formation within the individual sectors. The next model analysed the relationship between credit to the construction sector (LCONSTRC) and gross capital formation by this sector (LGCFCONSTR). Table 2 shows that both the Trace Statistic and the Maximum Eigen-Value indicate that at the 10 per cent level of significance there is one cointegrating relationship between construction credit and capital formation within the construction sector. Using a similar process to that above, we then test the significance of α_1 and α_2 at a 10 per cent critical level (Table 3 shows the values of α_1 and α_2). In this case, α_1 is found to be significant and α_2 is found to be insignificant. This is contrary to the results found for overall business credit and total gross capital formation. The significance of α_1 suggests that credit to the construction sector results in the accumulation of gross capital formation by this sector. Thus the relationship seems to be 'supply leading'.

The next model tested the relationship between manufacturing credit (LMANUC) and gross capital formation in the manufacturing sector (LGCFMANU). Both the Trace Statistic and the Maximum Eigen-Value indicate that at the 10 per cent level of significance, there is one cointegrating relationship between manufacturing credit and gross capital formation in the manufacturing sector. Table 3 show the results of the ECM model. In this case the relevant test statistic for α_1 is -3.259 and α_2 is 0.3011. Using a 90 per cent confidence interval it can be seen that α_1 is significant but α_2 was found to be insignificant. The significance of α_1 suggests that

manufacturing credit impacts gross capital formation in the manufacturing sector. That is, the relationship is found to be 'supply leading'.

Finally, cointegration analysis was also carried out on distribution credit (LDISTRC) and gross capital formation in the distribution sector (LGCFDIST). Table 2 shows the results of the cointegration test. Both the Trace Statistic and the Maximum Eigen Value test shows that at the 10 per cent level of significance, no cointegration or long run relationship exists between credit and gross capital formation in the distribution sector.

Table 2

Johansen Cointegration Test Results

Variables and Model	Null	Alternative	Trace Statistic	10% Critical Value	Maximum Eigenvalue	10% Critical Value
LBUSC - LGCF	r = 0	r ≥ 1	19.65344	17.98038	13.2003	13.90590
(1 -2.77 13.6)	r = 1	r ≥ 2	6.453115	7.556722	6.453115	7.556722
LPSC - LGCF	r = 0	r ≥ 1	19.61245	17.98038	12.86834	13.90590
(1 -4.66 32.47)	r = 1	r ≥ 2	6.744115	7.556722	6.744115	7.556722
LMANUC – LGCFMANU	r = 0	r ≥ 1	28.34851	17.98038	21.48786	13.90590
(1 -0.38 -5.77)	r = 1	r ≥ 2	6.860643	7.556722	6.860643	7.556722
LCONSTC – LGCFCONST	r = 0	r ≥ 1	21.07432	17.98038	19.80871	13.90590
(1 -0.78 -3.51)	r = 1	r ≥ 2	1.265616	7.556722	1.265616	7.556722
LDISTRC - LGCFDIST	r = 0	r ≥ 1	16.07171	17.98038	10.54279	13.90590
	r = 1	r ≥ 2				

Source: Eviews 6.0, Quantitative Micro Software, LLC

Notes: (1) The normalized cointegrating vectors are reported in the brackets.

(2) A constant term (but no trend) was included in the cointegrating regression.

r = rank.

Table 3

Results of the VECM Model

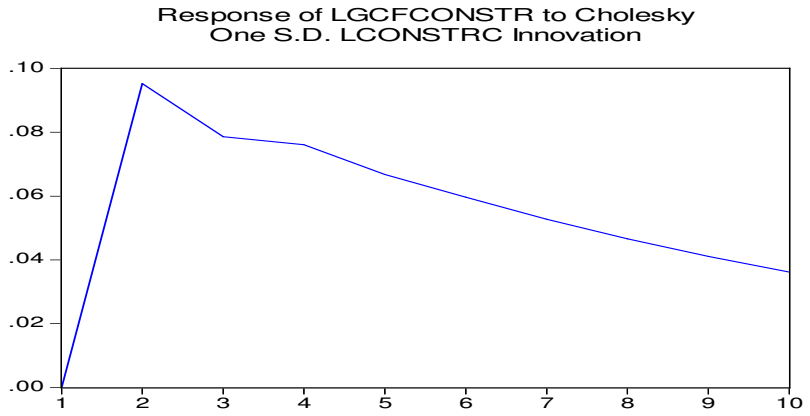
Model	α *ECM*	δ	ρ
Eq (1) DLBUSC	0.0042	0.23	0.158
	(0.2369)	(1.3865)	(2.867)
Eq (2) DLGCF	0.083	-0.113	0.067
	(2.752)	(-0.3953)	(1.887)
Eq (1) DLMANUC	-0.184	-0.151	-0.056
	(-3.259)	(-0.9773)	(-1.039)
Eq (2) DLGCFMANU	0.054	0.300	-0.420
	(0.3011)	(0.6151)	(-2.485)
Eq (1) DLCONSTC	-0.152	-0.005	0.131
	(-4.9041)	(-0.04)	(1.635)
Eq (2) DLGCFCONST	-0.003	0.42	-0.0116
	(-0.0472)	(1.56)	(-0.064)

Source: Eviews 6.0, Quantitative Micro Software, LLC.

Notes: The t-statistics are reported in parentheses.

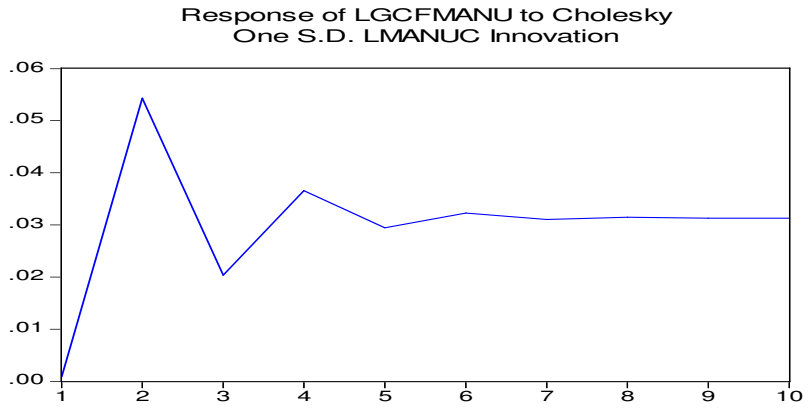
Further, the impulse response functions were analyzed to ascertain the short run dynamics between the sectors that displayed a "supply leading" relationship. Figure 4 shows the response of gross capital formation in the construction sector to a one standard deviation shock in construction credit. In response to an initial shock in construction sector credit, there is a sharp positive response in investment in the second period. Thereafter, the effects of a shock to construction credit subside but remain positive throughout the period.

Figure 4



A similar short run dynamic was observed for the manufacturing sector. Figure 5 shows that the impact of credit shocks on gross capital formation in the manufacturing sector is strong over the first three periods. The impact of the shock falls after period three but continues up to period ten.

Figure 5



Conclusion

In Trinidad and Tobago, commercial bank credit plays a large role in the way businesses and individuals finance economic transactions. Over the period 1970 – 2008, commercial bank credit averaged 35 per cent of GDP. It was also found that business credit accounts for the largest share of bank credit – 61 per cent over the past 38 years. Central banks, who attempt to influence the supply of credit via control of the money supply and interest rates, are particularly interested in the interaction between credit and economic growth. That is, how does credit impact on economic growth.

Drawing from the credit channel of the monetary transmission mechanism, this paper sought to assess the relationship between commercial bank credit and investment, with the presumption that the latter will in turn influence economic growth. The results showed that there is a long run relationship between credit and investment. Further, like previous studies, the relationship between credit and investment was found to be 'demand following'. This meant that overall, high levels of credit were achieved because of increased economic activity and that credit did not influence growth. However, an analysis of key sub-sectors produced interesting results. In both the manufacturing and construction sectors (collectively account for 22.2 per cent of total business loans), the relationship between credit and investment was found to be 'supply leading'.

This suggests that credit influences/impacts on investment within these sectors and thus will eventually lead to higher output.

The evidence shows that the manufacturing and construction sectors are normally likely to channel borrowed funds into investments. Therefore, credit to these sectors should spur investment and stimulate economic growth. From a developmental standpoint, ensuring that a steady source of credit is available to these sectors may be instrumental in developing the non-oil economy in Trinidad and Tobago.

References:

Balke, Nathan S. (1999). "Credit and Economic Activity: Credit Regimes and Nonlinear Propagation of Shocks," The Review of Economics and Statistics (#), 344-348

Bernanke, S. Ben and Mark Gertler (1995). "Inside the Black Box: The Credit Channel of Monetary Policy Transmission." The Journal of Economic Perspectives, Vol. 9, No. 4, 27-48

Birchwood, A. and S. Nicholls. (1999). "Credit, Investment and Economic Cycles in the Caribbean", Social and Economic Studies 91-125.

Guaisankar, Sanjay. "The Financing of Economic Growth: The Role of Private Sector Credit in Suriname," XXX Annual Monetary Studies Conference, October 26 – 30, 1998

Kohli, Renu. "Directed Credit and Financial Reform," Economic and Political Weekly, Vol. 32, No. 42 (Oct. 18-24, 1997), pp. 2667-2669+2671-2673+2675-2676

Lewis-Bynoe, Denny, S. Howard and W. Moore. "Determinants of Credit Booms in the Caribbean, Research Department Central Bank of Barbados, September 1998

Mishkin, S. Frederic (1995). "Symposium on the Monetary Transmission Mechanism." The Journal of Economic Perspectives, Vol. 9, No. 4, 3-10

Watson, K. Patrick and Sonja S. Teelucksingh (2002). "A Practical Introduction to Econometric Methods: Classical and Modern". University of the West Indies Press