



CENTRAL BANK OF TRINIDAD AND TOBAGO

EXAMINING THE TRINIDAD AND TOBAGO BANKING SECTOR'S EXPOSURE TO THE LOCAL HOUSING MARKET

Avinash Ramlogan and Wendy Ho Sing

Abstract

This paper examines the extent to which the banking sector in Trinidad and Tobago is exposed to the local housing market. The period under review is Q2:1995 – Q2:2014. We analyze various indicators of exposure and credit risk stress-testing results. Further, cointegration analysis is employed to assess the relationship (if any) between exposure and key macroeconomic variables. We find that exposure to the housing market in the banking sector increased in recent years. With respect to mortgage lending, exposure grew to 26.6 per cent (in terms of total net loans) as at June-2014 from 16.3 per cent at the end of 2008. However, stress test calculations for the commercial banking sector (the main sub-sector involved in mortgage and real estate related-lending) show that the capital adequacy ratio is likely to fall by 3.2 per cent to 18 per cent (well above the 8 per cent regulatory requirement) in the event of an adverse shock to house prices – indicating a low level of attendant risks. Therefore, financial stability risks arising out of exposure to the housing market to date appear to be small at least over the short-term.

JEL Classification: C32, E43, G21

Key Words: Housing market, bank exposure, financial stability, energy dependent economy.

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EXAMINING THE TRINIDAD AND TOBAGO BANKING SECTOR'S EXPOSURE TO THE LOCAL HOUSING MARKET

Avinash Ramlogan and Wendy Ho Sing (co-author)¹

1. Introduction

Developments in the housing market and credit exposures by the commercial banking sector have a co-dependent relationship which, without adequate risk management controls by the banks can lead to major defaults and institutional, if not systemic financial instability. Specifically, during persistent strong increases in house prices, such as in times of economic boom, commercial banks underwrite real estate mortgages which would comprise a high portion of their loan portfolio. Less than prudent underwriting standards applied to these mortgage loans would render the banks susceptible to a high risk of default and distress during the inevitable ensuing periods of house price decreases and their tightening of credit controls.

This inter-relationship is of particular relevance and importance for Trinidad and Tobago for the following reasons. Trinidad and Tobago's high dependence on energy (50 per cent of GDP and 85 per cent of total exports²) makes the economy vulnerable to shocks in international energy prices. In addition, due to the small size of the country, land is considered to be a scarce resource and limited in supply when it comes to housing for two important reasons. Firstly, land competes for public infrastructure, agriculture, industrial, commercial and various other uses. Secondly, the country's population is continuously increasing (0.4 per cent per annum³) so there is a growing need for land for housing. The shocks to international energy prices, when supported with pro-cyclical fiscal policies have, in the past, generated major changes in economic activity, bank lending, and prices of goods and services, including land and house prices.

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² Data sourced from Trinidad and Tobago CSO, annual average over period 2003 - 2013.

³ See footnote ².

The aim of this paper is to assess the extent of the exposure of the banking sector in Trinidad and Tobago to the local housing market⁴. Although the paper makes reference to the first energy boom in the 1970's and bust in the 1980's, most of the review is for the period Q2:1995 to Q2:2014 when the domestic economy experienced a strong expansion in activity owing to a second energy boom⁵ (Q2:1995 - Q3:2008) and also a slowdown in growth when the global financial crisis erupted (Q4:2008 – Q2:2014). The analysis is carried out in three segments. Firstly, we utilize various indicators to show the evolution of exposure over the entire period. Then, a stress-testing exercise is done using balance sheet data as at June-2014 to determine the potential losses banks are likely to face from future adverse shocks to house prices. Finally, we empirically assess the relationship (if any) between mortgage exposure and key macroeconomic variables such as property prices, interest rate movements and GDP, using cointegration analysis.

This study is important and timely for a number of reasons. Firstly, given the ultra-low interest rate environment and persistent growth in mortgage lending during the post crisis period to today, there is a justifiable concern that the domestic banking sector having reached historical high levels of exposure may be becoming (if not already) over-exposed to the local housing market. Secondly, although bank lending for home financing and major housing projects increased during the second boom period as expected, housing affordability issues popped-up with significant differences between the energy and non-energy sector employees. It is interesting to see how mortgage exposure was affected during this period. Thirdly, as studies on the local housing market are limited this paper should be well received as an addition to the existing literature.

The remainder of this paper is organized as follows: Section 2 summarizes the related literature locally and abroad. Section 3 briefly describes the structure of the housing and related finance system in Trinidad and Tobago. Section 4 analyses key trends in the housing

⁴ In Trinidad and Tobago, exposure to the housing market mainly includes real estate mortgages granted for the purchase or renovation of residential property. However, consultations with commercial banks reveal that residential properties may also be financed through commercial type mortgages. For instance, commercial mortgages are sometimes granted by banks to finance residential property for owner occupation but through business entities. It was also revealed that mortgages granted for dual purpose properties are either classified as residential or commercial in the regulatory reporting forms issued to banking sector. Further, the banking sector may become exposed to the housing market via lending to the real estate and construction sectors (e.g. loans to land developers). This paper attempts to analyze all these key forms of exposure.

⁵ This energy boom was driven largely by newly discovered crude oil and natural gas reserves and by the expansion of the liquefied natural gas sub-sector.

market and mortgage lending over the period of review. Section 5 assesses the banking sector in respect of its current exposure to the housing market, strengths and vulnerabilities. The final section concludes with some policy recommendations targeted to the banking regulators.

2. Literature Review

The literature on housing markets and related lending is quite extensive but studies that attempt to empirically assess and link housing market developments to associated lending exposures and risks, and the potential impact on bank soundness are rather sparse.

We find various studies that focus purely on modeling the determinants of mortgage delinquencies. Some of these studies utilize very detailed data on individual borrower and loan characteristics and concentrate on default probabilities in the United States. Quigley et al (2000) for example, find events such as divorce affect the probability of default on residential mortgages, while negative equity is the main time-varying factor influencing mortgage holders' decisions to default. Avery et al (1996) find that the major determinants affecting pure residential mortgage defaults are loan-to-value ratios and the borrower's credit history. Archer et al (1998) find that in the case of commercial mortgages, the loan-to-value ratio was a poor indicator of default risk, and that the spread between the loan and market interest rates prove to be a relatively better indicator. At a more macro level, Elmer and Seelig (1999) investigated data on foreclosures on single-family homes and find that shocks to house prices and income are two key variables most closely related to mortgage foreclosure rates. Igan and Pinheiro (2009) combine both micro and macro data to implement a comprehensive three-step procedure to assess the extent of exposure to real estate in commercial banks in the United States. Firstly, they model the determinants of mortgage delinquency. They then adopt a stress-testing approach to calculate the impact of adverse changes on the major determinants in the regression model. Finally, they look at cross-sectional differences and identify the banks with rapid loan growth along with high cost-income ratios as most vulnerable. Hilaire et al (2011) look at mortgage portfolio stress-testing to gauge the soundness of banks to plausible adverse declines in house prices that affect mortgage delinquency in the Trinidad and Tobago commercial banking sector.

A number of studies focus on developments in prices and activity and the incidence of boom-bust cycles in housing markets. For instance, IMF (2003) finds that across 14 industrialized

countries, approximately 40 per cent of house price booms were followed by busts. Similarly, the ECB (2003) finds that 55 per cent of booms in house prices in EU countries were followed by busts. Reinhart and Rogoff (2009a) in their study of financial bubbles show that house prices fall from peak to trough in excess of 35 per cent over an average period of 6 years. Claessens et al (2008b), in a study of business and financial cycles of 21 OECD countries over the period 1960-2007, also find that house price busts usually last for an extended period of generally more than 3 years. Other studies indicate that not all booms in housing prices are followed by busts (Burnside, Eichenbaum, and Rebelo, 2011). Auguste et al (2011) find evidence of a correction in house price in the Trinidad and Tobago housing market just prior to the end of the second boom period in 2008.

Several policy-oriented studies have documented the coincidence of housing and credit cycles (IMF 2000 and BIS 2001). Only a few studies were extended to empirically assess these relations. Hofmann (2001) for instance, who empirically assesses the correlation between these cycles finds long-run relations linking credit to the private sector positively to GDP, and real property prices but negatively to interest rates in a number of industrialized countries.

Some studies documented the incidence of financial crises and these housing and credit cycles. Reinhart and Rogoff (2009a) in their study of financial bubbles note that house price increases are indeed common shortly before banking crises surface. Bordo and Jeanne (2002) find that financial crises are triggered when house prices have peaked, or immediately after they have started falling. In a study of 15 advanced economies over the period 1970 - 2002 they identified 20 episodes of housing booms, of which 11 were followed by busts. Out of these 11 boom-bust cycles, 6 experienced banking sector crises. Crowe et al (2011a) similarly show that out of a sample of 23 countries that experienced booms in both housing market and credit over the period 2000 - 2007, 21 experienced either a financial crisis or a dip in economic activity in 2008 - 2009.

The lack of household data on a timely basis and on the aging of the banks' past due portfolio is a major drawback in our study of bank exposure to the local housing market (See section 5.1 for further data limitations). Nonetheless, we utilize available data in a way such as developing estimates that could give a meaningful picture of bank exposure to the housing market.

3. The Housing Market and Related Financing System: Institutional Structure and Characteristics

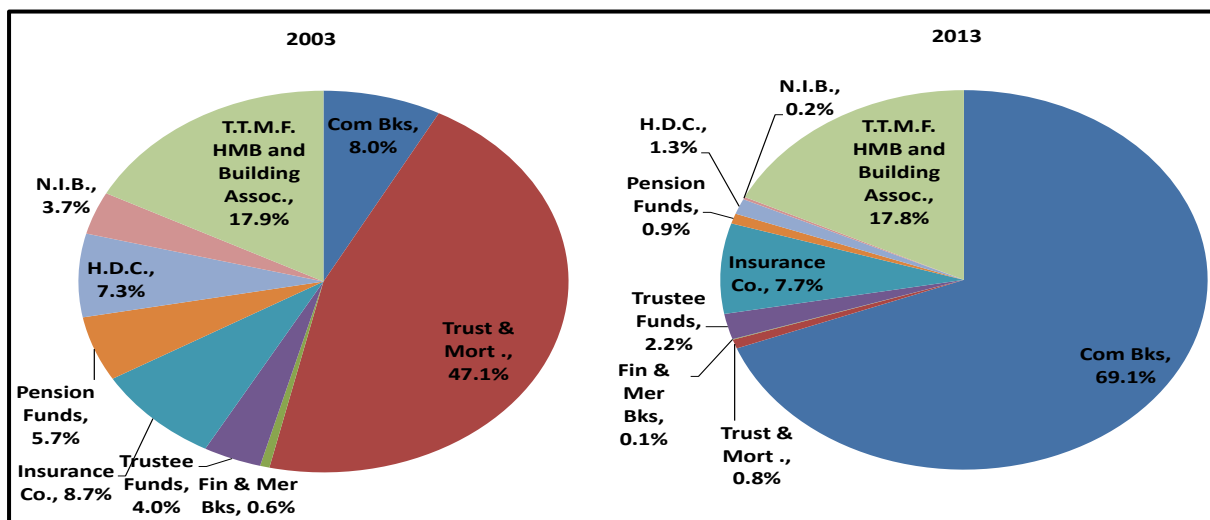
Public policy plays a significant part in the supply of housing as well as in the financing of housing in Trinidad and Tobago. In addition, there is a stable and robust private sector system of commercial banks and finance houses that support housing development. The state engages in the direct provision of housing units and a variety of housing solutions such as squatter upgrading and property rentals. Within the last decade the government provided the majority of housing units in the market while the remainder was supplied by the private sector. The Ministry of Housing (MOH) and accompanying state agencies which are the Housing Development Corporation (HDC) and the Land Settlement Agency (LSA), set housing policy on behalf of the government.

As regards housing finance, successive governments have also taken deliberate measures to improve this system over the years. As a consequence, the housing finance system in Trinidad and Tobago is considered well-developed when compared with systems in other Latin American and Caribbean countries. Financing for the purchase of residential and commercial property are carried out by a variety institutions, both public and private. Private sector mortgage lending operations are mainly carried out by commercial banks, trust and mortgage companies, life insurance companies, credit unions and pension funds with most of the trust and mortgage companies being affiliated to commercial banks. Besides these private sector institutions, two specialized public sector institutions, the Trinidad and Tobago Mortgage Finance Company Limited (TTMF) and the Home Mortgage Bank (HMB), also work with the Housing Development Corporation (HDC) and the Tobago House of Assembly (THA) to provide mortgages.

Within the last decade, a number of important structural changes occurred in the country's housing finance system. One major change was a shift in mortgage portfolio holdings by financial institutions which was influenced to some extent by the monetary policy actions of the Central Bank. With the reduction in the reserve requirement on commercial banks' prescribed liabilities from 18 per cent in 2003 to 11 per cent in 2004, many commercial banks realized that there was limited financial benefit in retaining mortgages on the books of their affiliated trust and mortgage companies. As competition for lending intensified, there was a transfer of the existing mortgage portfolios of the affiliated trust and mortgage companies

along with new mortgage origination to the parent banks. The strong growth in the domestic economy also coincided with a significant increase in bank liquidity which encouraged commercial banks seeking investment opportunities for their excess liquidity to hold on to their mortgage loans rather than sell them in the secondary market. By 2013, the commercial banks materially increased their market share, accounting for almost 70 per cent of total mortgages outstanding (compared with 8 per cent in 2003) by the major mortgage lending institutions. This large market share may be explained by commercial banks also lending for the purchase of commercial properties. The specialized mortgage lending institutions account for 17.8 per cent of mortgage holdings, while the life insurance companies (7 per cent) and other institutions such as pension funds and trust funds account for the remainder of the market (6 per cent) (Chart 3.1).

Chart 3.1
Trinidad and Tobago
Share of Real Estate Mortgages held the Major Lending Institutions
/Per cent/



Source: Central Bank of Trinidad and Tobago

Residential mortgages can either be **fixed- (FRM), variable- (VRM) or adjustable-rate (ARM)** with a maximum repayment term of 25 year, although under special circumstances the term can be 30 years for some clients. Most residential mortgages that are held by the commercial banks and NFIs are on an adjustable-rate basis with one repricing permitted by

the lender per year on the anniversary date of the mortgage⁶. Some institutions impose penalty fees for late payments or prepayment. Instalment-Income ratios vary across institutions. For instance, the TTMF requires a maximum limit on instalment-Income ratio to qualify for a mortgage of 33.3 per cent while for commercial banks the range is between 30 – 35 per cent. Some commercial banks mortgage policies require a maximum mortgage instalment-income ratio of 30 per cent, but a total debt service ratio of 40 per cent. Loan-to-Value ratios (LTVs) have been estimated to be around 75 per cent. Public sector agencies are known to offer up to 95 per cent in some instances. Commercial banks offer a LTV ratio of between 80 to 90 per cent but require the excess of 75 per cent to be covered by indemnity insurance.

4. Developments in the Housing Market and Related Financing Activities

4.1 Trends in house prices

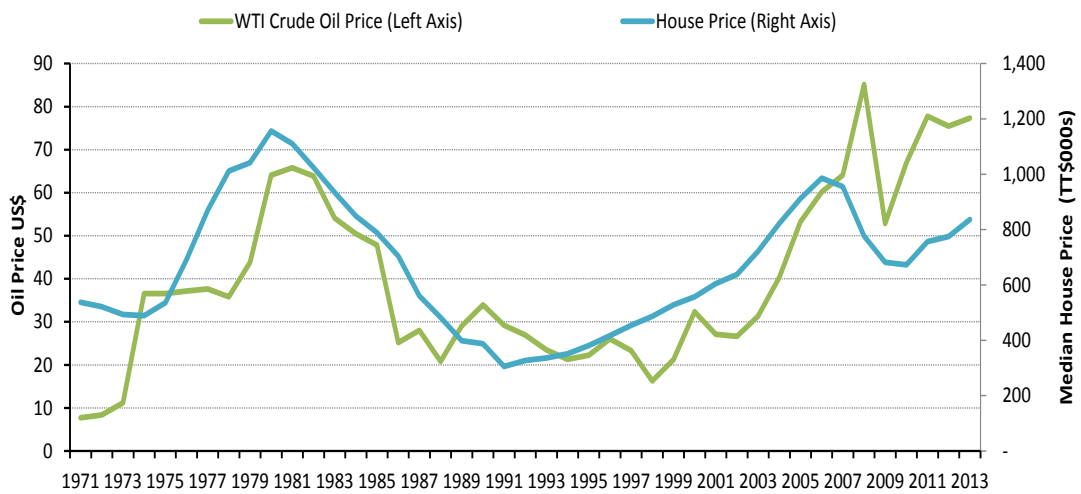
In Trinidad and Tobago house prices increased to very high levels during the 1970s but also collapsed in the 1980s after reaching its peak in 1979. House prices recovered in the early 1990s and strengthened further during the latter half of the decade. House prices escalated sharply during the 2000s, peaking again in 2006. The trend in house prices observed in the second boom period (1995 to 2006), however, appeared to be slightly different when compared to the first. During the second boom house prices increased at a more gradual pace than in the first boom period. In addition, house prices peaked at a much lower level in 2006 than in 1979. House prices have been appreciating once again since 2010. Chart 4.1.1 below plots the long-run trend in housing prices and crude oil prices (WTI) (in real terms). The chart shows a surprisingly high positive correlation between these two variables for Trinidad and Tobago.

The increase in the house price during the 2000s may be explained by the wealth shock which emanated from the surge in energy prices. It is apparent that households that were benefiting from an increase in incomes passed that liquidity to the housing market through their demand for housing units and housing upgrades. Concurrently, there was a strong demand for housing from expatriates and for safe housing properties such as gated communities in the face of

⁶ See the Central Bank of Trinidad and Tobago's "Residential Real Estate Mortgage Market Guideline issued in September 2011.

escalating crime At that time, the housing market became attractive to private sector developers who undertook large-scale housing projects targeting the high-income households that demanded high-end housing. The response by private sector developers was, however, insufficient to meet the demand for housing units during the period. This was further compounded by the competing demand for land for government infrastructure.

Chart 4.1.1
WTI Crude Oil Price vs. Median House Price
/ In terms of 2003 constant prices/



Source: Central Bank of Trinidad and Tobago’s Handbook of Key Economic Statistics, AREA and authors calculations.

Note: The real crude oil price was found by deflating the nominal crude oil price using US Consumer Price Index. The real house price was calculated by deflating the nominal median price by the TT Retail Price Core Index. The base year was 2003 for both indices.

Secondly, the government’s housing policy during the boom period focused on meeting the housing needs of the low-income segment of the population. Studies undertaken by the government in the early 2000s found that there was a lack of adequate housing to meet the needs of low income households in Trinidad and Tobago⁷. In response to this situation, the government implemented programmes and policies aimed at providing affordable housing. One of these included the Rent-to-Own Program whereby clients were allocated public housing units to rent up to a period of five years with the option to purchase thereafter. Another was the Approved Mortgage Company Program (AMCP) which had been introduced since the 1970’s. Both state-owned as well as private sector lending organizations participated in this programme by providing subsidized mortgages to low and middle income

⁷ Ministry of Housing and Settlements, “Showing Trinidad and Tobago a New Way Home”, 2002.

households. Some of the policies and programmes implemented also attempted to provide housing via innovative non-mortgage financing mechanisms. These included: (i) The Accelerated Housing Programme that was implemented in 2003 which consisted of three components: Infill Lots, Joint Venture and Urban Housing Programme, whereby the allocation of housing was done under a Cabinet approved Allocation Policy; (ii) the Home Improvement Grant and Home Improvement Subsidy, that was administered by the Ministry of Planning, Housing and the Environment to assist low-income households to conduct critical repairs to their homes to maintain an existing stock, and (iii) the beneficiary Owned Land Program which provided subsidies for the construction of homes for low-income households who are owners of their land. The response by the government was also insufficient to meet the demand for housing. These factors fuelled house prices during the boom period.

4.2 Trends in home ownership and housing affordability

Efforts by the government over the decades to improve housing conditions have led to a very high homeownership rate (78.7 per cent)⁸ in Trinidad and Tobago. This fact can be seen, when we compare the home ownership rate in Trinidad and Tobago with those in other countries such as in the Latin America (e.g. Chile 71.3 per cent) and Caribbean region (e.g. Jamaica 63 per cent, see Table 4.2.1)

Chart 4.2.1 provides some interesting trends in housing affordability. Particularly for those employed in the non-petroleum sector, housing affordability appeared to have eroded during the boom of the 1970s. The average number of years it would take a household to pay for a house at the median price increased from 10.7 years in 1973 to 16.3 years 1979. Housing affordability began to erode from the mid-1990s. It is apparent that the wealth shock which was triggered by the surge in energy prices in the early 2000s aggravated housing affordability even further as income inequality problems surfaced⁹. Available data also show that there was a rise in the number of years an average household took to pay for a median

⁸ According to data provided by the Central Statistical Office for 2011, the number of private households totaled 401,382 while the number of residential dwelling units totaled 313,261 [285,207 (owned) + 28,648 (owned but hold mortgages) + 2,350 (rent-to-own)]

⁹ Auguste et al 2011 note that per capital permanent income became more unequal during the boom period than in the pre-boom period. According to their study the Gini coefficient increased from 0.44 in 1992 to 0.471 in 2005.

priced house of 15.3 years in 2002 to 19.3 year by 2007, which represent a loss of housing affordability.

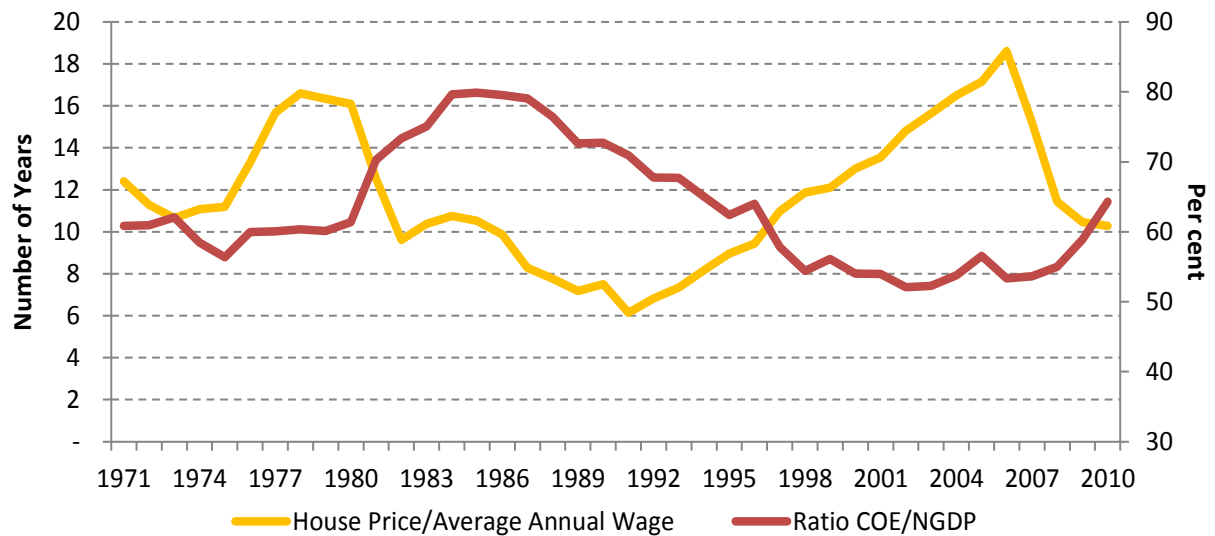
Another factor that adversely affected housing affordability in the second boom period can be seen in the unemployment data. In 1995, the unemployment rate was high (17.2 per cent). This allowed the economy to grow without any significant increases in wages in the non-energy sector of the economy. The additional boost to the economy from the surge in energy prices in the 2000s resulted in a greater number of persons becoming employed within low and middle income households. Chart 4.3.1 which plots the ratio of compensation of employee to non-energy GDP shows a decline from 64 per cent in 1995 to 53.3 per cent by 2006. This background information is essential in understanding the evolution of private sector and mortgage credit developments.

Table 4.2.1
Country Comparison: Homeownership Rates

Country	Home Ownership Rate (%)	Date of Information
Developed Countries		
United Kingdom	66.7	2012
Canada	69.0	2011
United States	64.7	Q2:2014
Spain	78.9	2012
Developing Countries: Caribbean		
Bahamas	57.7	2001
Jamaica	63.0	2008
Suriname	62.4	1999
Trinidad and Tobago	78.7	2011
Developing Countries: Latin America		
Argentina	72.2	2003
Brazil	74.4	2008
Chile	71.3	2003
Uruguay	67.0	2004

Sources: Distribution of population by tenure status, type of household by income group, Eurostat; 2011 National Housing Survey: Homeownership and Shelter Costs in Canada, Statistics Canada; Homeownership rates - Census.gov, Jamaican Survey of Living Conditions 2008; Survey Results: Brazil Stays Strong in the face of the Crisis, World Bank; Encuesta Continua de Hogares ,Instituto Nacional de Estadística; CACEN, Ministerio de Planificación; Encuesta Permanente de Hogares, Instituto Nacional de Estadística y Censos; Population and Housing Census Demographic Report, 2011, Trinidad and Tobago Central Statistical Office

Chart 4.2.1
Housing Affordability and Compensation of Employees to GDP Ratios



Source: Trinidad and Tobago Central Statistical Office, Handbook of Key Economic Statistics, authors' estimates.

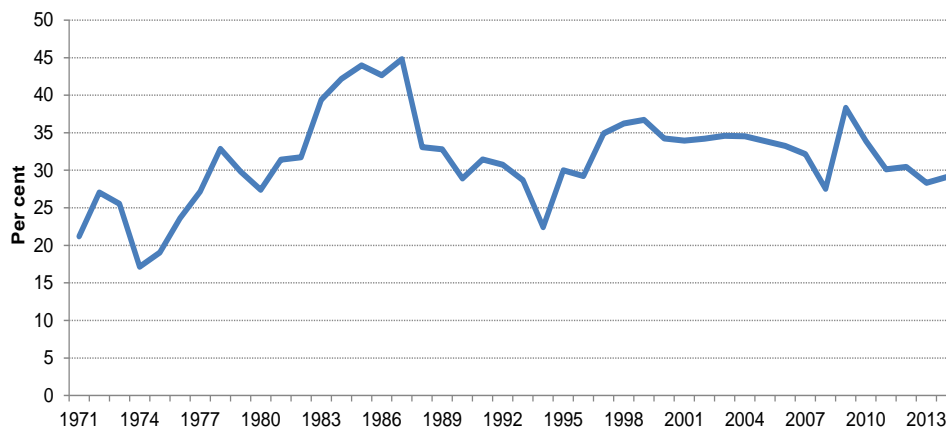
Note: Affordability Ratio = Median House Price/Average Annual Compensation per employee (Non-energy sector). COE/NGDP Ratio = Compensation of Employees in Non-Energy Sector/Non-energy GDP

4.3 Credit developments

Private sector credit also showed rapid growth in the past at the same time that oil prices surged. In the 1970s, when GDP was increasing, private sector credit granted by the banking sector was growing at an even faster pace. It is apparent that there was great optimism about the economy at that time, which in turn fuelled bank credit. The onset of the second boom period in the mid-1990s also impacted private sector credit which started to increase again. The growth in credit however, seemed moderate in the second boom when compared with the first (Chart 4.3.1).

The excessive lending that occurred during the first boom period resulted in significant exposures to the housing market among some newly established finance houses and three indigenous commercial banks. One of the commercial banks, the Workers' Bank, accumulated excessive exposures to housing finance through an innovative scheme called the VARINSTALL Plan. After the boom period ended in the 1980s, the decline in economic activity and the consequent rise in unemployment led to financial problems in four finance houses as well as the Workers' Bank (See Appendix Box 1 and CBTT, 2007).

Chart 4.3.1
Private Sector Credit to GDP Ratio
/Per cent/

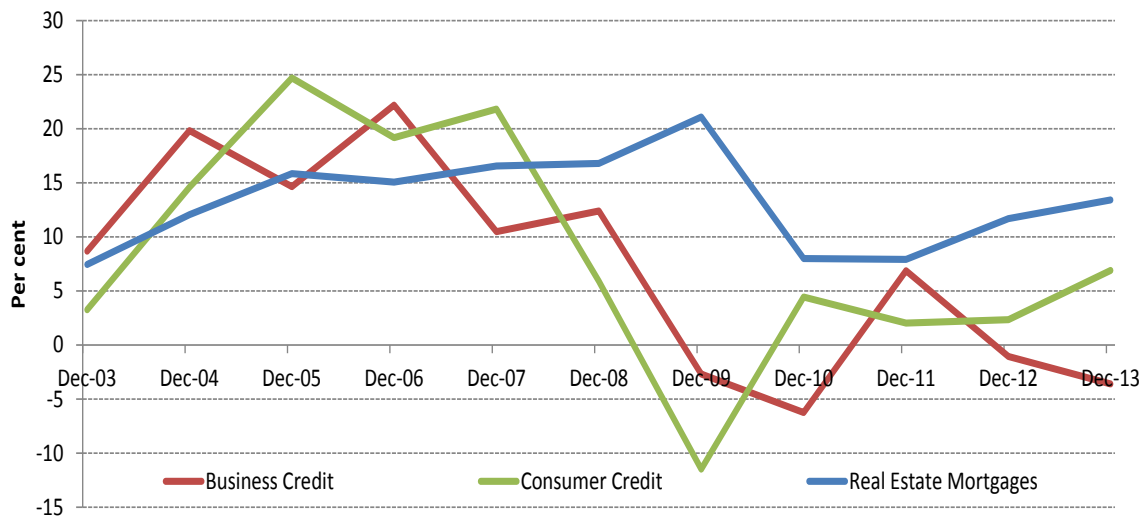


Source: CBTT Handbook of Key Economic Statistics and authors' estimates

Mortgage lending also reflected the loss of housing affordability among the non-energy working population that occurred in the second boom period. The stock of mortgages held by the major lending institutions increased from \$ 7,372.3 million in 2003 (or 10.4 per cent of GDP) to \$19,805.7 million (or 8 per cent of GDP) at the end of 2008. Mortgage funding grew but not as fast as the expansion in total GDP in the domestic economy.

A closer analysis of mortgage credit granted by the banking sector during and after the second boom period tells an interesting story. The expansion in mortgage lending appeared to be similar to other key categories of lending such as to consumers and businesses during the boom period (Chart 4.3.2). However, in the post-boom period, mortgage credit displayed the strongest growth rate when compared with the other main categories (2010 – Q2:2014). Data on average mortgage size reveal that growth in the mortgage portfolios of these institutions was particularly related to a higher loan size due to the appreciation in house prices as opposed to a larger number of mortgages. Interestingly, the average loan size held constant in both 2009 and 2010 but began to rise again during the last three years, coinciding with more recent appreciation in house prices (Charts 4.3.4 and 4.3.5).

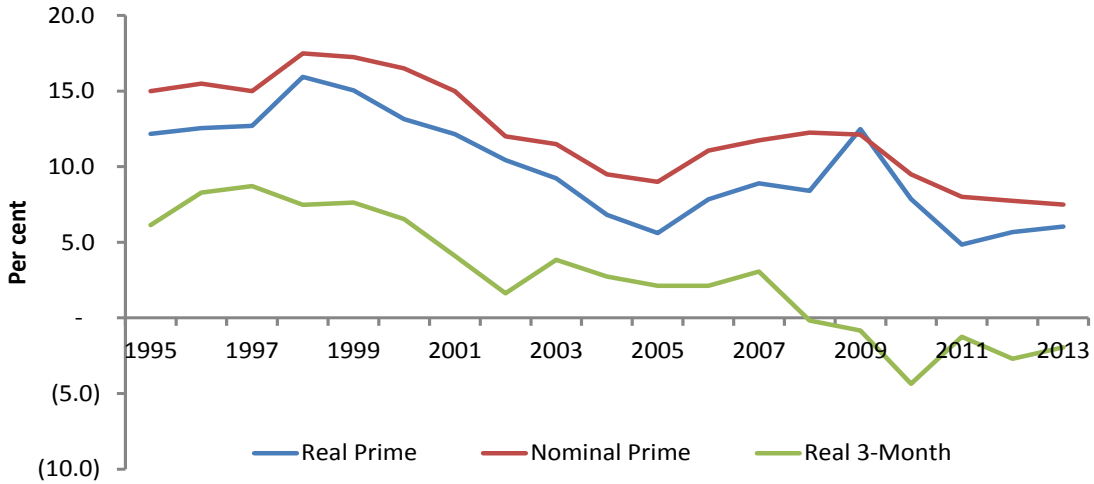
Chart 4.3.2
Consolidated Banking System:
Growth in Consumer, Business and Mortgage Credit
/Per Cent/



Source: Central Bank of Trinidad and Tobago

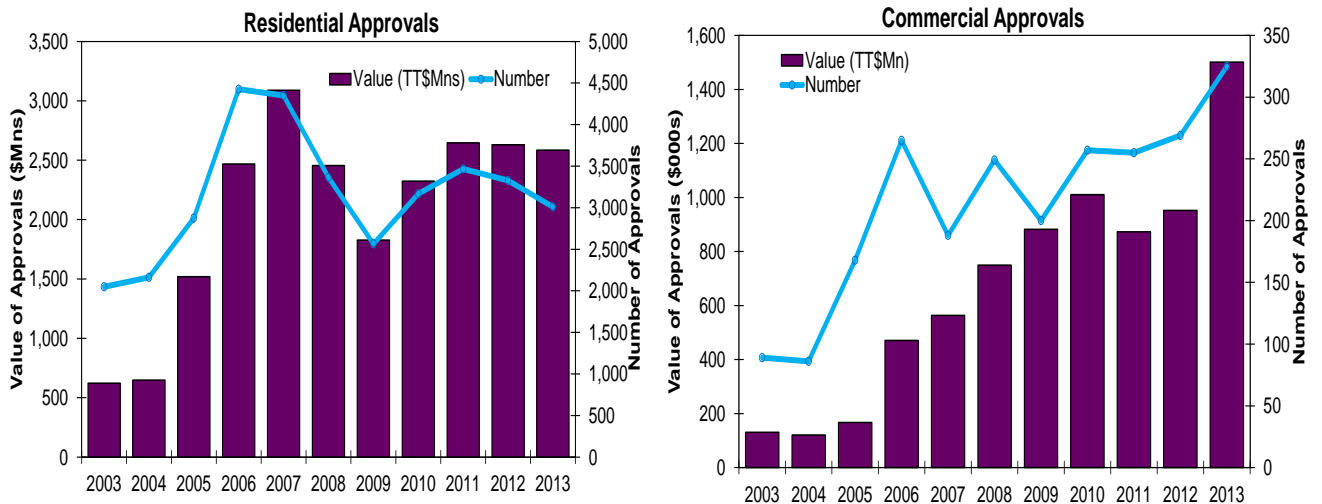
The movement in interest rates, as we saw in the literature can have a negative impact on housing credit. An analysis of the trend in historical and current interest rates and mortgage credit appears to hold true for Trinidad and Tobago. Real interest rates, which represent the real cost of financing, declined throughout most of the boom period. The real prime and 3-month treasury rates which stood at 12.2 per cent and 6.1 per cent in 1995 fell to 5.6 per cent and 2.1 per cent by 2005, respectively. An ultra-low interest rate environment which emerged during the post-boom period seems to be supporting mortgage growth. Low interest rates may also be a key contributing factor in fuelling house prices through higher mortgage demand (Chart 4.3.3).

Chart 4.3.3
Commercial Banks: Nominal and Real Prime Lending Rate
/Per cent Per Annum/



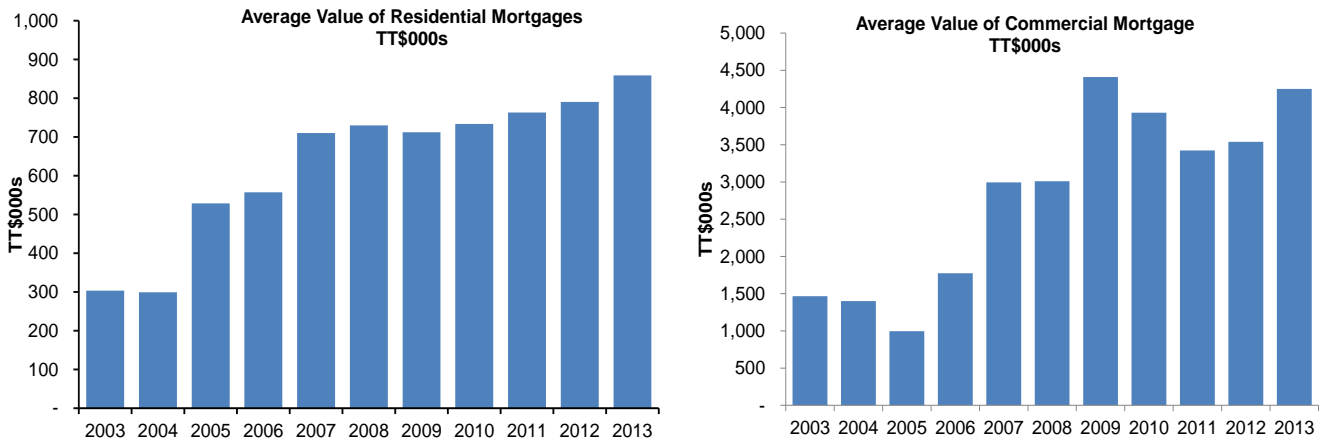
Source: Central Bank of Trinidad and Tobago

Chart 4.3.4
Banking Sector: Residential and Commercial Mortgage Approvals



Source: Central Bank of Trinidad and Tobago

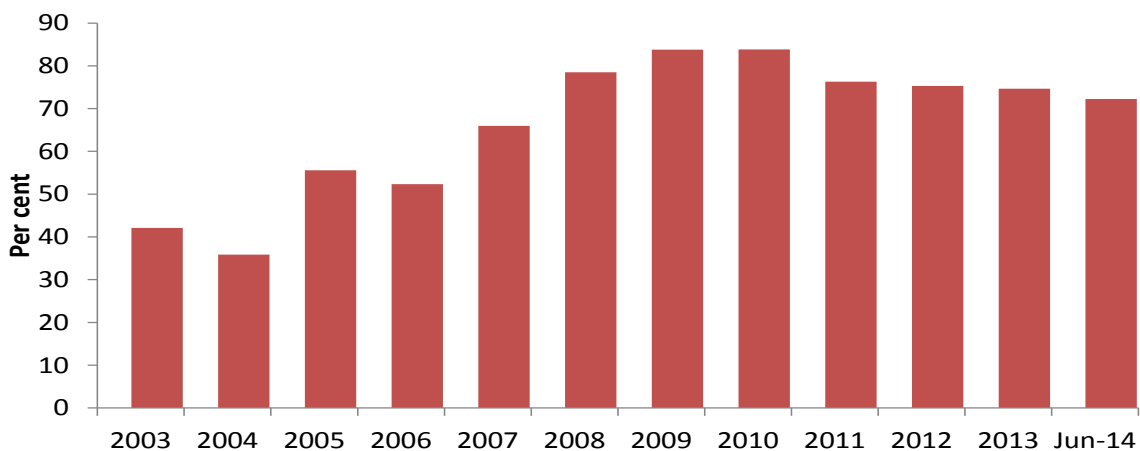
Chart 4.3.5
Consolidated Banking System: Average Mortgage Size



Source: Central Bank of Trinidad and Tobago

Another important finding is that commercial banks, in the face of persistent ultra-low interest rates, made significant attempts to boost their profitability from mortgage business by expanding credit granted. One measure that institutions implemented was to attract new business by offering increased loan-to-value (LTV) ratios on mortgages and embarking on huge campaigns to market mortgage loans. Using data to derive an implicit LTV for residential mortgages, we saw that LTVs increased from 42.1 per cent in 2003 to approximately 78.9 per cent by 2008. Since 2009 banking institutions reduced their LTV ratios slightly (72.3 per cent as at June 2014) as they became a bit more cautious about mortgage financing in a weakened economic environment (Chart 4.3.6).

Chart 4.3.6
Consolidated Banking System
Implicit Residential Mortgage Loan-to-Value Ratios
Per cent



Source: Author's Calculations

Note: The implicit loan-to-value ratio was calculated as the average value of the mortgage divided by the estimate median house price.

5. An Assessment of Real Estate-Related Exposures¹⁰

5.1 Data limitations

A major factor hindering a proper understanding of the banking system's exposure to the housing market is the lack of timely information and in some instances, no information. There is no comprehensive set of price, rental and transactional statistics for various types of residential and non-residential property. At the moment, only a crude measure of the median house price is available which is derived using valuation estimates from private property valuers. Up-to-date information of wages, employment conditions and household debt are also essential in understanding trends in housing affordability. Hence we complemented the data at hand with estimates in some instances.

It is also a difficult task to gauge the potential losses that banks can face by way of mortgage delinquency due to cycles in the local housing market and their capacity to absorb these losses before their soundness is severely impacted. This is because a proper time-series data set does not exist for past-due loans by time period (e.g. current, 0dys – 30dys, 31dys – 90dys etc.). The Central Bank only began collecting disaggregated data on past-due loans for various economic sectors, including mortgages (that is, residential and commercial mortgages), in 2010.

5.2 Trends in Exposure

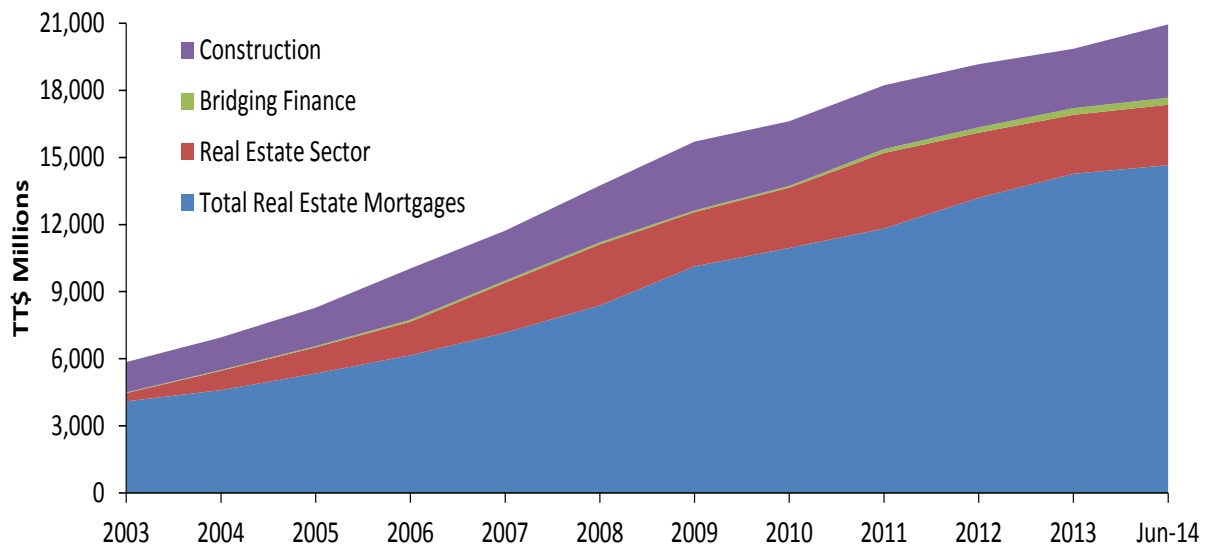
In this section we analyze various indicators to gain an understanding of the evolution of exposure over the period 2003 to June-2014. Although commercial banks and non-bank financial institutions participate in the housing market in various ways, we confine our analysis to exposures to real estate mortgages, and other real-estate related lending (which are bridge financing and loans extended to the real estate and construction sectors).

Data for the banking sector show that total real estate-related loans stood at \$5,849.8 million in 2003 but increased to \$20,952 million by end-June 2014. Real estate mortgages account for the majority of real estate-related loans. Interestingly, real estate mortgages as a share of

¹⁰ In Trinidad and Tobago, the **banking sector** comprises eight (8) commercial banks, and sixteen (16) non-bank financial institutions (NFIs) - seven (7) trust and mortgage companies and nine (9) finance houses.

total real estate-related loans fell from 69.9 per cent in 2003 to 60.9 per cent at the end of 2008, but increased again to 70 per cent by June- 2014 (Chart 5.2.1).

Chart 5.2.1
Banking Sector: Stock of Real Estate-Related loans
 /TT\$ Millions/



Source: Central Bank of Trinidad and Tobago.

With the bulk of the loans in the form of real estate mortgages, the remainder is loans to businesses that operate in the real estate and construction sectors ¹¹ (such as loans to property developers) and bridge financing. The fact that the banking sector increased its holdings of mortgages and real estate-related loans, taken alone, could imply that the sector escalated its exposure to the housing market to a perilously high level over the last decade to June 2014 (Chart 5.2.1).

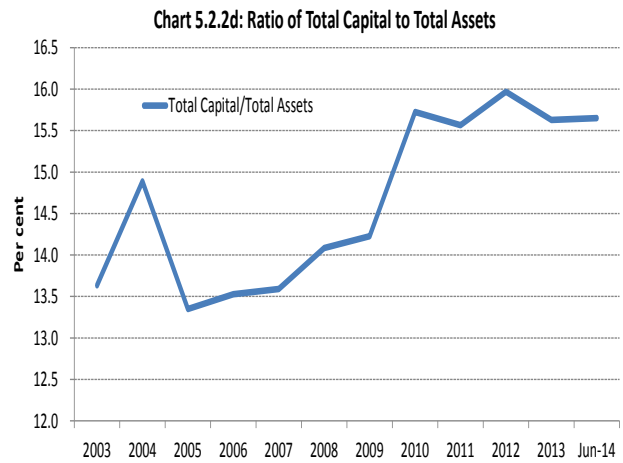
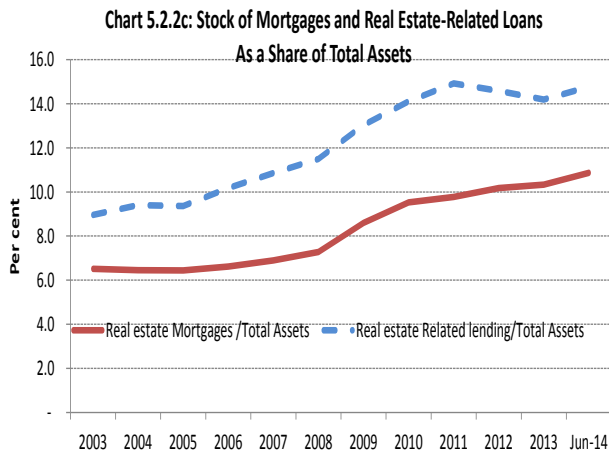
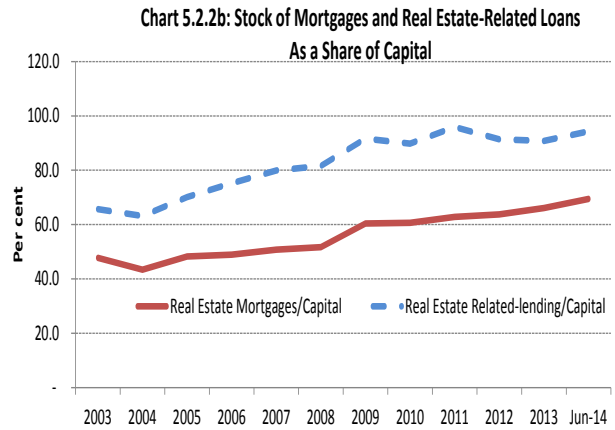
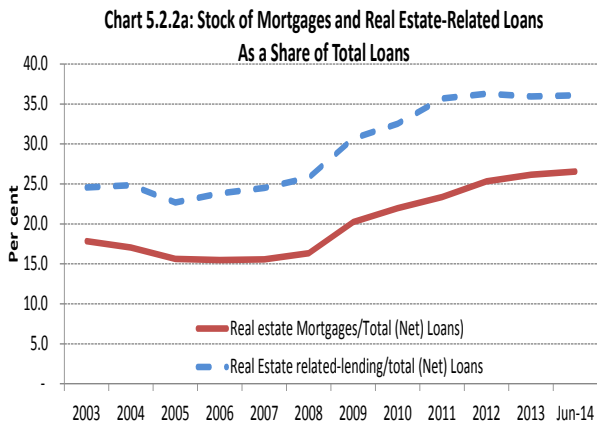
Other measures of real estate exposure, defined relative to the banking sector's total loans, assets and equity capital, provide further insights into the extent of exposure to housing and real estate market activities. Chart 5.2.2a shows that real estate mortgages as a portion of total

¹¹ According to the Central Banks' reporting surveys, "Real Estate Sector Loans" include loans for the letting and operating real estate, such as non-residential buildings, apartment buildings and dwellings, developing and subdividing real estate into lots, including the development and sale of cemetery lots and residential development on own account, lessors of real property, real estate agents, brokers and managers engaged in renting, buying, selling managing and appraising real estate on a contract fee basis. This group however, does not include operators of hotels, rooming houses, camps, trailers, and other lodging places.

loans outstanding in the banking sector fell from 17.8 per cent in 2003 to 16.3 per cent at the end of 2008. The Chart also shows that the share of mortgages as a proportion of total loans climbed to 26.6 per cent by June 2014. It should be noted also that when considering total real-estate related lending, exposure rose from 26.8 per cent in 2008 to about 37.2 per cent at end June 2014.

Real estate mortgages as a share of total capital was 47.7 per cent in 2003 but climbed to 51.7 per cent by 2008. This ratio continued to rise thereafter to reach 69.4 per cent by June 2014 (Chart 5.2.2b). One can also notice that mortgages as a share of total assets raised from 6.5 per cent in 2003 to 7.3 per cent by 2008 and again to 10.5 per cent by June 2014, indicating a greater level of exposure (Chart 5.2.2c). However, one can find comfort in the fact that the banking sector increased both its level and quality of capital to accommodate the increase in assets as seen in the ratio of capital-to-assets moving from 13.6 per cent in 2003 to 15.6 per cent at end-June 2014 (Chart 5.2.2d).

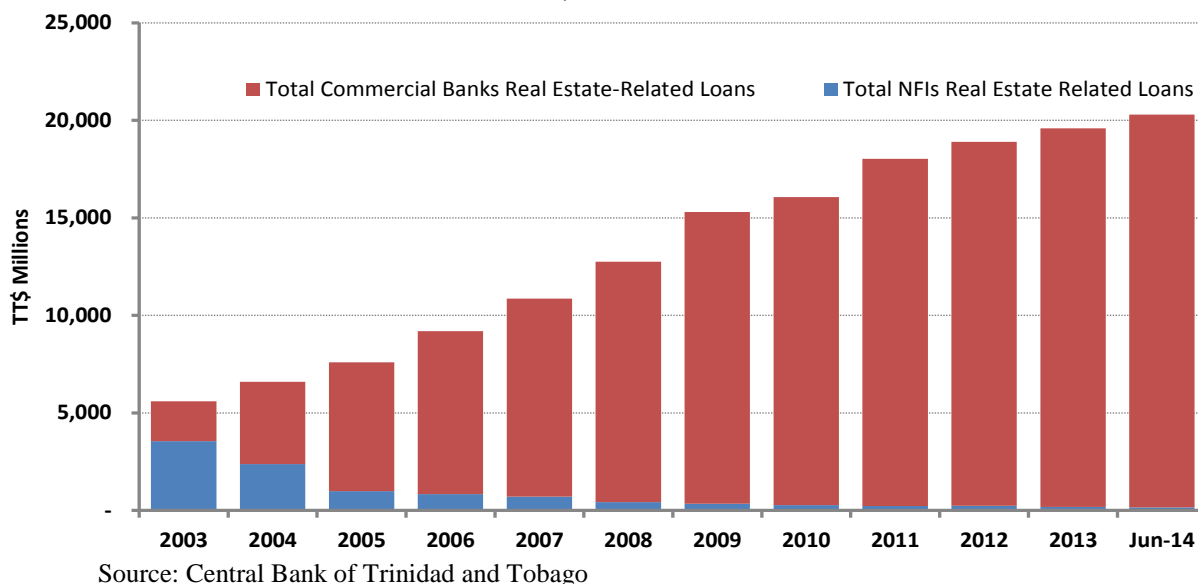
Chart 5.2.2 Banking Sector: Indicators of Real Estate Exposure /Per cent/



Source: Central Bank of Trinidad and Tobago

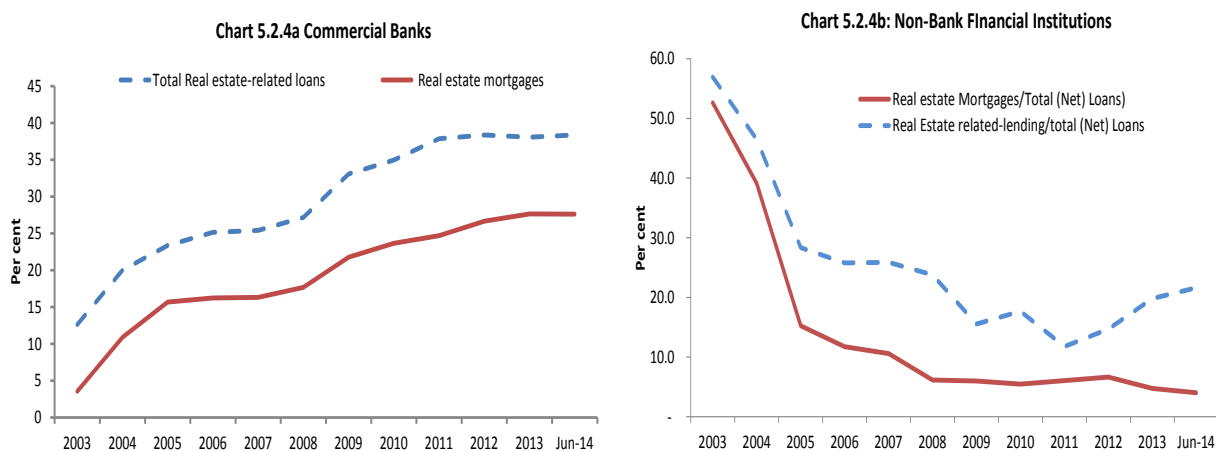
The structural changes that have occurred in the mid-2000s altered the relative positions of the commercial banks and NFIs in terms of their exposure to the housing market and real estate-related activities. In looking at Chart 5.2.3 one can notice that by end-June 2014 commercial banks emerged as the main holders of outstanding real estate-related loans in the banking sector, with roughly \$20,141.2 million (or 99.2 per cent of total banking sector related loans) in their portfolios. The NFIs, which account for the remaining 0.8 per cent, held \$810.8 million in real estate-related loans.

Chart 5.2.3
Banking Sector: Stock of Real Estate-Related loans
 /TT\$ Millions/



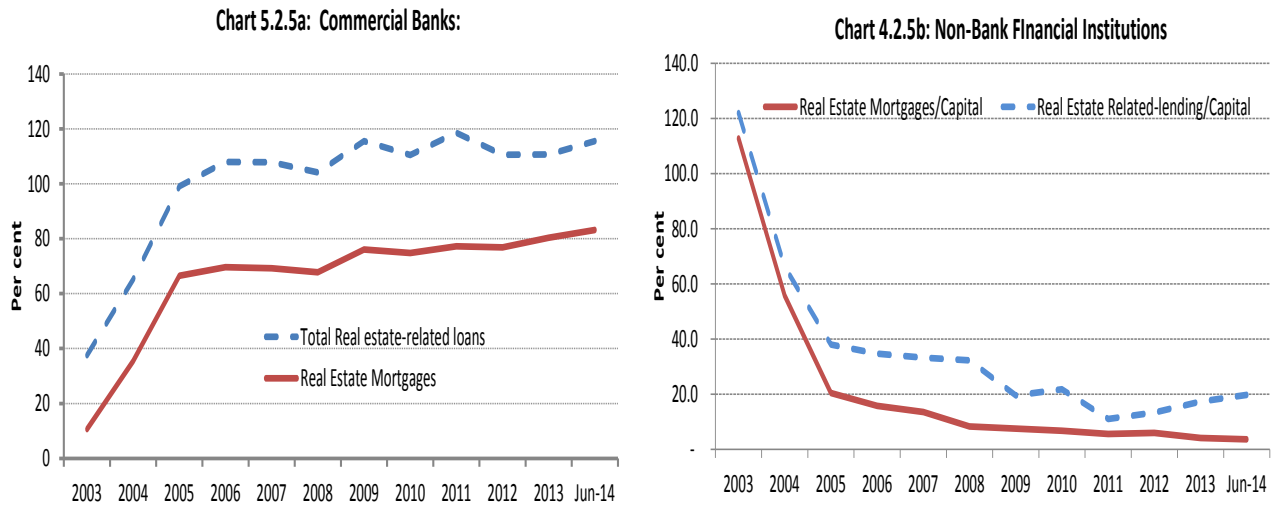
Commercial banks witnessed a growth in mortgage exposure from 3.6 per cent in 2003 to 17.7 per cent in 2008. Since 2005, commercial banks also competed heavily with non-bank financial institutions for real estate-related loans. Commercial banks, due to access to cheap liquidity, were able to grant demand type loans to private property developers mainly for the construction of luxury apartment complexes and for land development. This type of lending added to commercial banks' exposure (Chart 5.2.4).

Chart 5.2.4
Stock of Mortgages and Real Estate-Related Loans
 As a Share of Total Loans
 /Per cent/



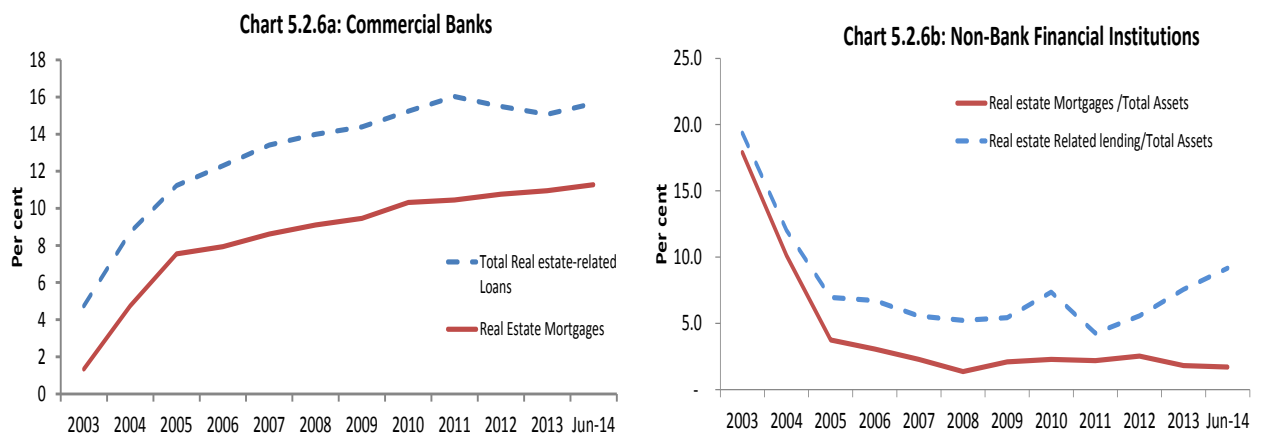
The ratios of mortgages to capital as well as total assets also tell a similar story about the level of exposure to the housing market increasing in commercial banks (Charts 5.2.5 and 5.2.6).

Chart 5.2.5
Stock of Mortgages and Real Estate Related Loans
As a Share of Total Capital
/Per cent/



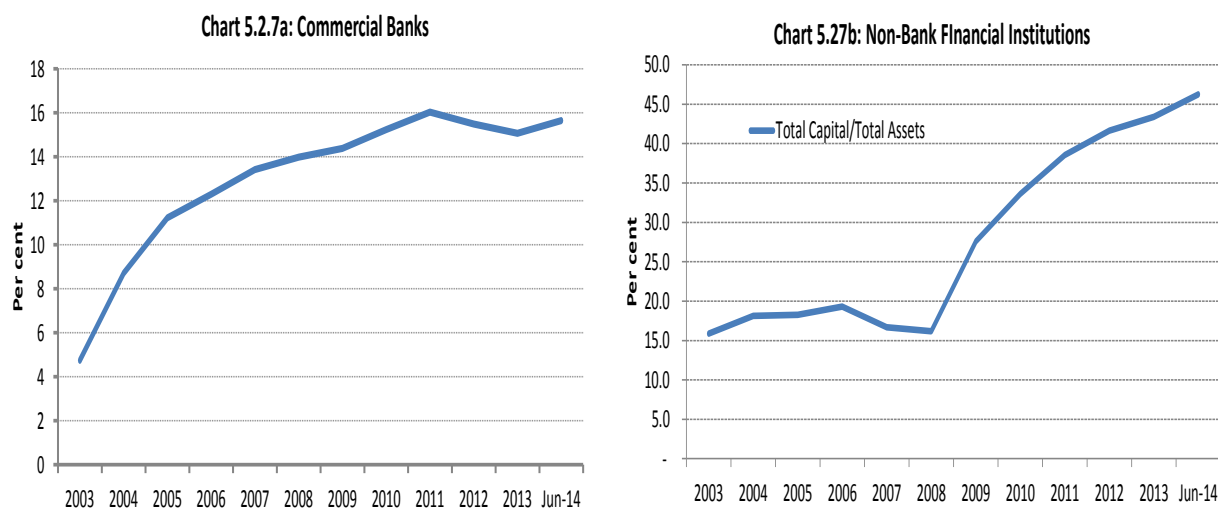
Source: Central Bank of Trinidad and Tobago

Chart 5.2.6
Stock of Mortgages and Real Estate-Related Loans
As a share of Total Assets
/Per cent/



Source: Central Bank of Trinidad and Tobago

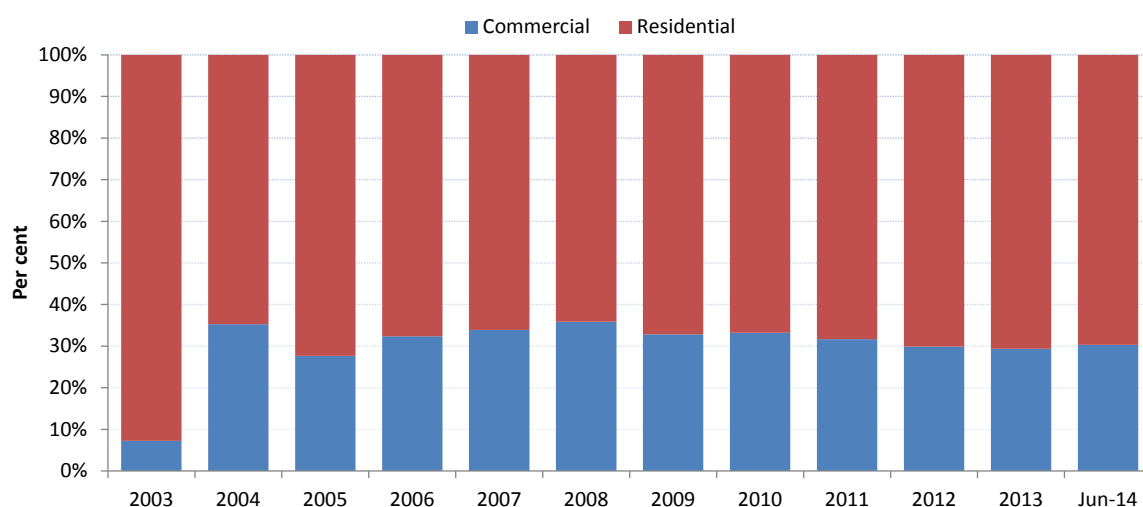
Chart 5.2.7
Total Capital Relative to Total Assets
/Per cent/



Source: Central Bank of Trinidad and Tobago

As regards the commercial banks, it is also interesting that the increase in exposure was mainly driven by residential mortgages since 2009. The share of residential mortgages in the mortgages portfolio of banks slipped from 72.3 per cent in 2005 to 64.9 per cent by 2008 but rose thereafter to 69.7 by June 2014. Commercial mortgages, however, increased from 27.7 per cent in 2005 to 35.9 per cent by 2008, but fell thereafter to 29.9 per cent by June 2014 (Chart 5.2.8). This is not too surprising since commercial mortgages are generally considered to be riskier than residential loans for two reasons. Firstly, the key source of repayment is cash flows from the real estate collateral and secondly, commercial properties are known to have much more price volatility than residential properties. The decline in the share of commercial mortgages however, requires further investigation since there exists a high possibility that some commercial banks may have removed delinquent commercial loans from their portfolios. Another issue that needs to be considered is the possibility of emergence of a “*local sub-prime*” market.

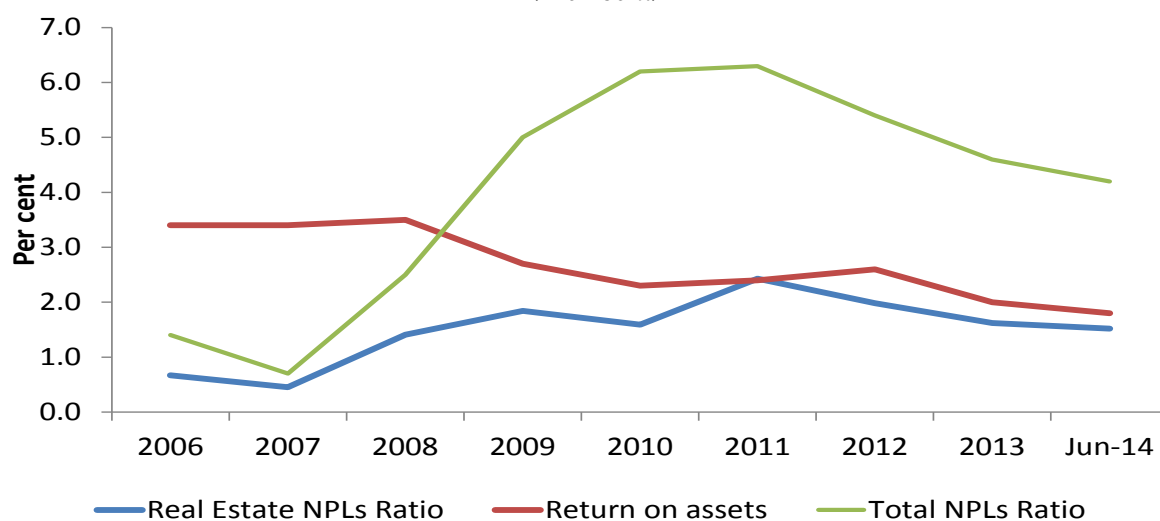
Chart 5.2.8
Commercial Banks' Real Estate Mortgages Outstanding
Share of Residential vs. Commercial
 /Per cent/



Source: Central Bank of Trinidad and Tobago

Commercial banks' balance sheets and profitability have been affected by the downturn in the economy and the slowing of the housing market. Commercial banks experienced a considerable decline in profitability in the wake of the crisis. Profitability recovered somewhat but remains well below the pre-crisis period. A decline in asset quality was a key factor contributing to the fall in profitability. The ratio of total non-performing loans rose from less than 3 per cent in the period of strong economic expansion to almost 6.3 per cent by end-2011 and reflected exposures to luxury real estate developments and also problems faced by some businesses in servicing their commercial mortgages. The NPLs ratio however declined to 4.2 per cent by end-June 2014 as commercial banks took action to restructure problem loans (Chart 5.2.9). In particular, the ratio of non-performing real estate mortgages grew from below 1.5 per cent in the boom period to almost 2.5 per cent at end-2011 before falling to 1.52 per cent by June 2014.

Chart 5.2.9
Commercial Banks: Return-on-Assets and NPL Ratios
/Per cent/



Notes: 1. Real Estate NPLs Ratio = Real Estate Mortgages past due 90 days and over/Total Real Estate Mortgages and 2. Return on Assets Ratio = Profit after tax/Average Total Assets

5.3 Stress-test: Methodology and Results

In this section we focus on stress-testing the commercial bank sub-sector since these institutions account for most of the mortgages and other real estate-related lending in the banking sector. Also, as mentioned earlier only the commercial banks are actively involved in mortgage lending business since the transfer of mortgage portfolios in the mid-2000s. Stress tests provide an estimate of the potential losses the commercial banking sector is likely to face given its exposure to the housing market as at June 2014. In this stress test we assume that a decline in asset quality will manifest in a rise in non-performing real estate mortgages and other real estate-related loans, which will require additional provisioning. The methodology we used is based on migrating loans from one past-due bucket to another and the additional provision to be applied is calculated based on the Central Bank Guideline 2007¹². The increase in required provisioning is offset against the banks' CARs. The shocks formulated were increases in real-estate NPLs of the following magnitudes: 30 per cent; 40 per cent; and 50 per cent.

Stress-testing results for the commercial bank sub-system also reveal some important information about exposure to the housing market and other real estate-related activities.

¹² See the Central Bank of Trinidad and Tobago "Guideline for the Measurement, Monitoring and Control of Impaired Assets" issued in 2007.

Table 5.3.1 shows the results of the impact of three house price shocks on the commercial banks. At the onset, it is important to note that the bank sub-sector is well capitalized with a CAR of 23 per cent, which is much higher than the 8 per cent regulatory requirement. Even when adjusted for cases of under-provisioning by some institutions the CAR stands at 21.2 per cent. The results indicate that this sub-sector, taken as a whole, could withstand a severe shock to the housing market which could manifest in 50 per cent of current loans becoming delinquent. The losses arising out of the shock reduces the CAR by just 3.2 per cent. Therefore, following this shock, the banking system's CAR stands at 18 per cent.

Table 5.3.1
Commercial Bank Sub-Sector
Stress-Tests Results on Mortgage and Real Estate-Related Portfolios as at June-2014
/Per cent/

Shock parameter/ Increase in NPLs	30	40	50
Pre-Shock CAR	23.0	23.0	23.0
Pre-Shock Adjusted for under-provisioning	21.2	21.2	21.2
Decline in the CAR	2.0	2.6	3.2
Post-Shock CAR	19.3	18.6	18.0

Source: Central Bank of Trinidad and Tobago

5.4 Relationship between Mortgage Exposure and Macroeconomic variables

To more precisely measure the extent to which the macroeconomy and the housing market influence mortgage exposure in the banking sector, we conduct a cointegration analysis exercise. The model devised looks at mortgage exposure as a function of economic activity, interest rates, and property prices. In the literature we note that while exposure by banks is dependent on bank-specific (or internal) factors, macroeconomic factors can exert a strong influence on these institutions' exposure to various sectors of the economy. In fact, studies show that economic growth, interest rates, and house price movements are strongly correlated with banks' credit risk and profitability.

Economic conditions, reflected by the state of economic activity, have a positive effect on bank mortgage exposure. All else equal, growth in aggregate income is likely to strengthen households' and firms' ability to meet their debt obligations and may encourage banks to increase their mortgage lending for the purchase of real estate.

Interest rates, represented by market interest rates, are expected to have a negative effect on mortgage credit demand. When interest rates go up, mortgage loans become more expensive and loan demand is reduced by households. Higher interest rates may also affect the demand for commercial mortgages and influence real estate firms' decision making because the profitability of housing investments may decline. The reverse is likely to occur in the case of a reduction in interest rates. The stance of monetary policy by the Central Bank is also likely to impact on the supply of fund available for mortgage lending by the banking sector.

Property prices affect the willingness of banks to lend via balance sheet effects. Financial market imperfections can constrain the ability of households and firms to borrow. As a result, households and firms may borrow when they provide collateral so their borrowing capacity is a function of their collateralized net worth. Since property is a common form of collateral, property prices are an important determinant of private sectors borrowing capacity. Property prices also affect the value of banks' capital, both directly to the extent that banks hold real estate assets on their balance sheets, and indirectly by affecting the value of loans secured by property. Property prices therefore affect the risk-taking capacity of banks and thus their willingness to extend loans.

The empirical model

Long-run relationship

The discussion of the determinants of bank exposure earlier suggests that we develop a model explaining the long-run movements in bank exposure which would involve a measure of economic activity and interest rates. Much added value would be made if this model also includes the role of house prices as a key determining factor. The empirical model therefore is based on the following long-run relationship:

$$XP = \alpha + \beta_1.NY + \beta_2.R + \beta_3.P + \varepsilon$$

where XP is (log) real mortgage credit relative to total credit to the private sector, NY is (log) real output, and R is the real rate of interest, and P is (log) the real property price¹³.

¹³ In this paper the real interest rate is defined as the prime lending rate minus core inflation, and the index of domestic production (non-energy) was used as a proxy for real out in the non-energy sector.

Unit root testing

Appendix Table 1 reports the results of the two distinct unit root tests: the Augmented Dickey-Fuller test and the Phillips-Perron test. The results show that the null hypothesis of a unit root (non-stationary) in the levels of XP, NY, R and P cannot be rejected. However, when the tests are performed on the first differences of the series of the same variables they cannot be classified as integrated of order 1 (i.e. I (1))

Cointegration analysis

In this section an analysis of the relationship between mortgage exposure and these variables (if any) is conducted using the Johansen multivariate approach to cointegration¹⁴. The sample period for the analysis is the second quarter of 1995 to the second quarter of 2014. The lag order of the VAR was chosen in order to ensure well-behaved VAR residuals. Diagnostic tests for the estimated system, which are reported in Appendix Tables 2 and 3 show that the system is free of serial correlation and heteroscedasticity.

The test results for the model, which are shown in Table 5.4.1, reveal that only one cointegrating vector is present in the data (asymptotic standard errors are shown in the brackets).

¹⁴. The maximum likelihood method of Johansen (1988, 1991, and 1995) is based on the error correcting form of a vector autoregressive (VAR) model. Consider a (q,1) vector of I(1) variables x_t and the following vector autoregressive (VAR) representation of it: $x_t = B_1x_{t-1} + \dots + B_kx_{t-k} + \varepsilon_t$ where B_s are (q,q) matrices. This VAR model can be formulated in vector error correcting form as follows: $\Delta x_t = T_1x_{t-1} + T_2\Delta x_{t-2} + \dots + T_{k-1}\Delta x_{t-k+1} - Tx_{t-1} + \varepsilon_t$ where $T_i = -(I+B_1 + B_2 + \dots, B_k)$ $i=1,2,\dots,k$. This long-run coefficient matrix is of the order $n \times n$ and the rank of the matrix produces the number of cointegrating vectors r . For a detailed illustration of the Johansen procedure see Watson, K.P. and Teelucksingh Sonja S. (2002).

Table 5.4.1
Johansen Test for Cointegration

$H_0: \text{rank} = p$	Trace Statistic	0.05 Critical Value	Max Eigenvalue Statistic	0.05 Critical Value
$p = 0$	49.44*	47.86	21.69	27.58
$p \leq 1$	27.75	29.79	18.38	21.13
$p \leq 2$	09.36	15.49	07.14	14.26
$p \leq 3$	02.23	3.84	02.23	03.84

Note: * Existence of cointegration at 5% significance level.
Source: Eviews 7.0 Micro Software, LLC

Long-Run Relationship

Models (Lags)	Long-Run Equation	Loading Coefficient (α)
Model (2)	$XP = 0.34NY - 0.91R - 1.34P + 20.85$ (1.98) (3.42) (5.23)	-0.08 (-3.57)

Note: The table displays the test statistic of the Johansen trace statistic tests for cointegration, the identified long-run relationship and the loading coefficient (α) in the VECM equation for bank asset exposure; lags () indicate the lag-order of the underlying VAR. XP represents the log of banking sector mortgage asset exposure, Y the log of index of domestic production (non-energy), R is the log of real interest rate and, P the log of the real house price. The long-run and loading coefficient is significant at least at the 5 % level.
Source: Eviews 7.0 Micro Software, LLC

The results of the modelling exercise reveal that mortgage exposure is related positively to real output but negatively interest rates. As expected, exposure is negatively related to house price and also significant. The value of the coefficient of house price also suggests that long-run movements in mortgage exposure are highly affected by changes in house prices. One possibility is that, exposure is adversely affected by the loss in housing affordability as house prices increase. Another possibility is that the increase in house prices may be encouraging homeowners to draw on the equity of their homes as collateral for consumer borrowing. This is supported by the high homeownership rate that already exists in the country. The adjustment coefficient, which is shown in the Table, is significant at least at the 5 per cent level. This means that exposure adjusts to the identified long-run relationship, supporting the view that it represents a relationship linking long-run movements in real estate exposure to real output, real interest rates and real house prices. The adjustment coefficient is rather

small, implying that in case of deviations of exposure from its long-run equilibrium, this should be corrected rather slowly.

Short-Run Dynamics

It seems useful to also investigate the properties of the long-run models in a VECM format. The use of a VECM allows for specifying both the long-run and short-run dynamics of the model. In particular, while the cointegrating vector is generally interpreted as a long-run equilibrium relationship, the estimates of the short-term dynamics help to characterize the process of adjustment towards this long-run equilibrium. The model estimated in a VECM over the period Q2:1995 – Q2:2014 is shown in Appendix Table 6.

Appendix Chart 2 displays the impulse response of mortgage exposure to one-standard deviation shocks to real output, the real interest rate, and the real property price. As expected, the general picture is that real estate exposure responds positively to domestic output, but negatively to the property price and interest rate shocks. The innovations to real output do not trigger a strong response in real estate mortgage exposure. Meanwhile, innovations to the real house price and the real interest rate result in a strong and persistent response in real estate exposure in banks.

6. Conclusion

In recent years, exposure to the local housing market and real estate related lending in the banking sector trended upwards. This situation does not appear to present any financial stability risks, at least in the short-term. One level of comfort can be seen in the capital adequacy ratio (CAR) for the commercial bank sub-sector, which is 23 per cent (and 21.2 adjusted for under-provisioning for non-performing loans) as at June 2014. This level of capital is well above the minimum regulatory requirement of 8 per cent. Further, stress-tests done on the loans portfolios of commercial banks show that the post-shock capital adequacy ratio fell by a maximum of 3.2 per cent to 18 per cent under a severe stressed scenario of a rise in non-performing loans equivalent to a collapse in house prices of 50 per cent.

Another layer of comfort can be seen in the data on house prices (*in real terms*). The estimated median house price is currently 10 per cent lower than its peak in 2006. Further,

when compared with the peak of the boom 1970s, the current estimated price is even much lower (22.9 per cent).

In terms of the vulnerabilities, firstly, mortgage rates in the banking sector have been ultra-low for some time now. Low mortgage rates improve housing affordability for many households, especially in the low and middle income segment of the households. A reversal of mortgage rates could adversely affect many households' ability to service their mortgages especially if the increase in wages does to match that of house prices. This vulnerability is likely to escalate if mortgage rates continue to remain low and property price appreciates. The threat to financial stability is also likely to surface if banks' exposure to mortgages and related lending continues to climb. In the absence of timely data on wages (the latest data - 2010), it is difficult assess whether wages are rising faster or slower than property prices.

Even though exposure to the housing market and real estate activities does not appear to present any major risks in the short-term on-going monitoring and assessment of exposure is crucial to maintaining financial stability. It is recommended that controls be in put place to avoid over-exposure in the future. One important way the Central Bank can ensure that the banking sector does not become over-exposed to the housing market is to utilize stress testing as a tool to control exposures. Among other tools and indicators, stress testing can assist in ensuring that banks only lend when they pass stress-testing exercises based on plausible parameters and scenarios. Although the Central Bank is currently conducting stress-tests a formal stress-testing guideline can be developed and implemented for the banking sector. Another way is to develop of a proper database to monitor and assess the housing market. This database should include data on pricing such as on residential and commercial property prices, rents, and on activity (example, number of new units approved and constructed by the private sector and the state).

7. Appendices

DIAGNOSTICS
TABLE 1
TESTING FOR UNIT ROOTS

Variables	ADFTest Statistic		PP-Test	
XP	-0.020	-2.900	-0.415	-2.587
Δ XP	-7.741	-2.287	-7.800	-2.587
NY	-2.773	-2.900	-2.517	-2.900
Δ NY	-8.401	-2.901	-12.82	-2.901
R	1.374	-2.901	-0.069	-2.901
Δ R	-7.823	-2.901	-12.60	-2.900
P	1.196	-1.945	2.000	-1.945
Δ P	-2.155	-1.945	-2.04	-1.945

Source: Eviews 7.0 Micro Software, LLC

TABLE 2
LM TEST FOR SERIAL CORRELATION

Lags	LM-Stat	Probability
1	16.11118	0.4452
2	20.20297	0.2112
3	11.71104	0.7636
4	33.88393	0.0056
5	10.47809	0.8405
6	1047809	0.8381
7	13.83445	0.6110
8	20.20130	0.0632
9	16.19324	0.2113
10	9.810534	0.4396
11	14.28773	0.5773
12	18.65955	0.2867

Source: Eviews 7.0 Micro Software, LLC

TABLE 3
CHOLESKY (LUTKEPOHL)
VECM RESIDUAL NORMALITY TEST

Skewness	Kurtosis	Jarque-Bera
9.832	172.875	182.708

Source: Eviews 7.0 Micro Software, LLC

TABLE 4
VECM Residual Portmanteau
For Autocorrelation

Lags	Adj. Q Stat	Probability
1	2.620905	NA*
2	20.80985	0.8332

3	3282858	0.8920
4	62.49349	0.3877
5	71.966641	0.6098
6	82.04741	0.7619
7	95.90551	0.7910
8	117.5413	0.6461
9	134.2735	0.6206
10	144.7047	0.7316
11	158.6891	0.7583
12	176.7477	0.7115

Source: Eviews 7.0 Micro Software, LLC

TABLE 5

VAR Lag Order Selection Criteria
 Endogenous variables: XP NY R P
 Exogenous variables: C
 Date: 09/30/14 Time: 15:41
 Sample: 1995Q2 2014Q2
 Included observations: 69

Lag	LogL	LR	FPE	AIC	SC	HQ
0	56.53152	NA	2.56e-06	-1.522653	-1.393139	-1.471271
1	462.7118	753.4939	3.14e-11	-12.83223	-12.18466	-12.57532
2	508.6756	79.93694*	1.33e-11*	-13.70074*	-12.53512*	-13.23830*
3	524.2787	25.32686	1.36e-11	-13.68924	-12.00556	-13.02127
4	540.0982	23.84391	1.40e-11	-13.68401	-11.48228	-12.81051
5	553.2336	18.27522	1.58e-11	-13.60097	-10.88119	-12.52194
6	564.6283	14.53239	1.91e-11	-13.46749	-10.22965	-12.18293
7	579.4015	17.12843	2.15e-11	-13.43193	-9.676040	-11.94184

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

source: Eviews 7.0 Micro Software, LLC

CHART 1
Inverse Roots of AR Characteristic Polynomial

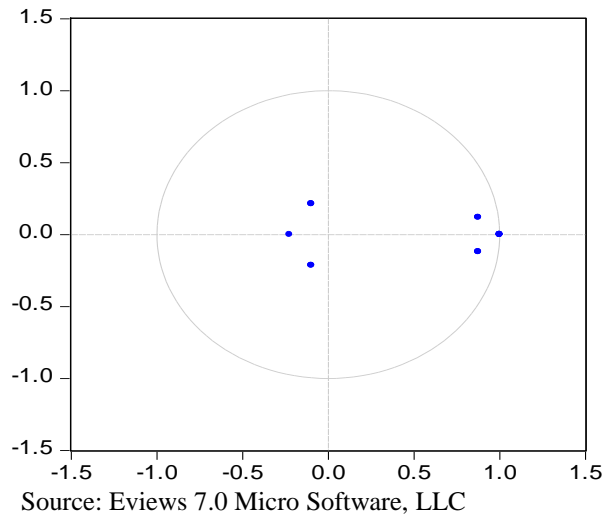


TABLE 6

Vector Error Correction Estimates
 Date: 09/30/14 Time: 15:39
 Sample (adjusted): 1995Q4 2014Q1
 Included observations: 74 after adjustments
 Standard errors in () & t-statistics in []

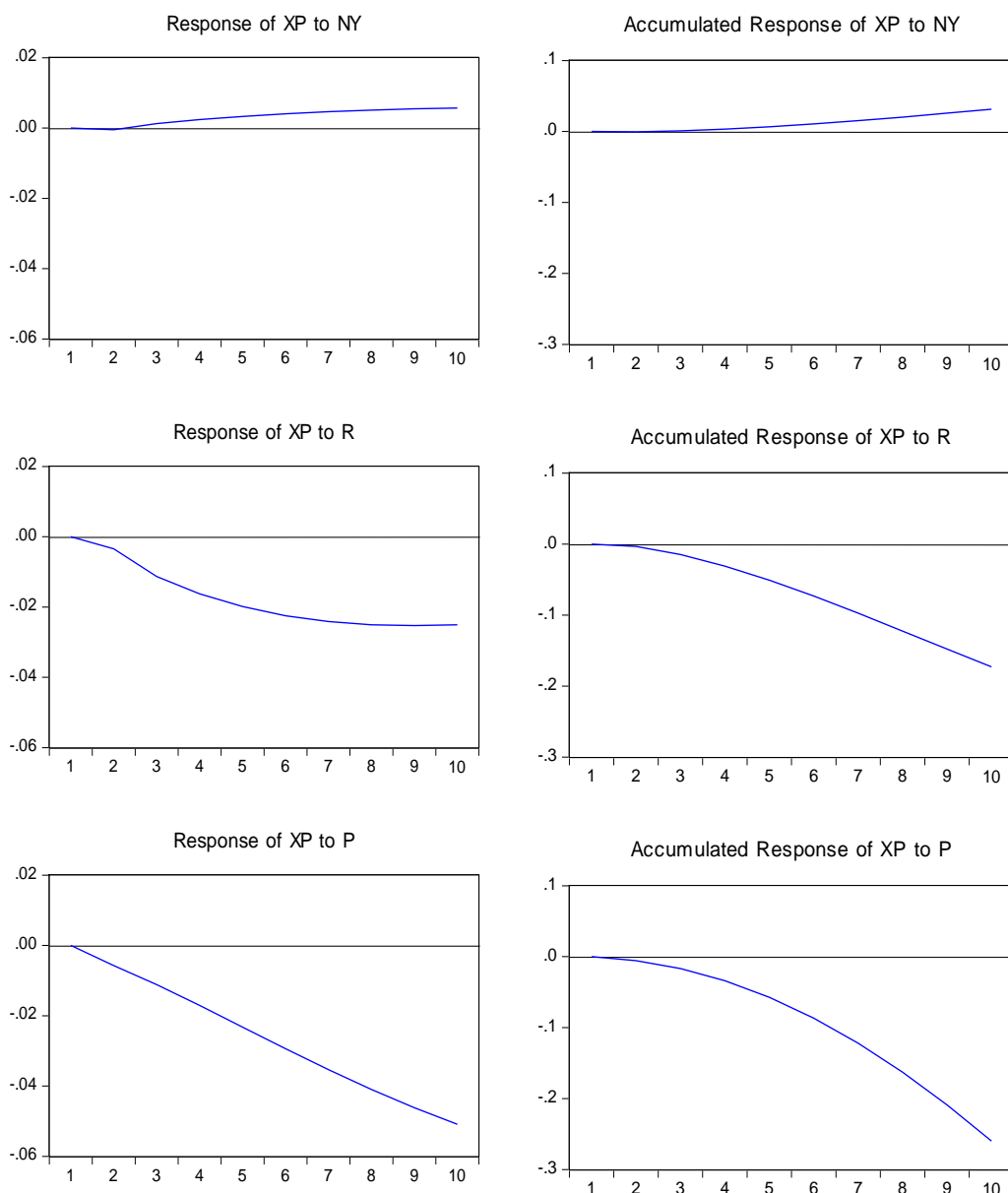
Cointegrating Eq:	CointEq1			
XP(-1)	1.000000			
NY(-1)	-0.340154 (0.17144) [-1.98408]			
R	0.911895 (0.26593) [3.42911]			
P(-1)	1.341279 (0.25631) [5.23297]			
C	-20.85296			
Error Correction:	D(XP)	D(NY)	D(R)	D(P)
CointEq1	-0.076453 (0.02144)	0.074908 (0.03777)	-0.156857 (0.07406)	-0.013652 (0.00763)

		[-3.56628]	[1.98331]	[-2.11810]	[-1.78880]
D(XP(-1))	-0.106873 (0.11329) [-0.94335]	0.114415 (0.19960) [0.57323]	-0.789239 (0.39135) [-2.01669]	-0.002328 (0.04033) [-0.05773]	
D(NY(-1))	-0.038086 (0.06796) [-0.56043]	-0.168940 (0.11973) [-1.41102]	-0.135165 (0.23475) [-0.57577]	-0.002108 (0.02419) [-0.08714]	
D(R(-1))	0.056550 (0.03553) [1.59181]	-0.060922 (0.06259) [-0.97335]	-0.078017 (0.12272) [-0.63573]	-0.015199 (0.01265) [-1.20180]	
D(P(-1))	-0.385966 (0.21276) [-1.81409]	-0.369524 (0.37484) [-0.98581]	0.292817 (0.73496) [0.39841]	0.945863 (0.07574) [12.4879]	
C	0.008067 (0.00517) [1.56186]	0.033702 (0.00910) [3.70366]	-0.009451 (0.01784) [-0.52972]	0.001041 (0.00184) [0.56591]	
R-squared	0.266040	0.085118	0.121228	0.727475	
Adj. R-squared	0.212073	0.017847	0.056613	0.707437	
Sum sq. resids	0.082185	0.255099	0.980714	0.010416	
S.E. equation	0.034765	0.061249	0.120093	0.012376	
F-statistic	4.929630	1.265298	1.876144	36.30373	
Log likelihood	146.7041	104.7949	54.96951	223.1330	
Akaike AIC	-3.802812	-2.670131	-1.323500	-5.868459	
Schwarz SC	-3.615996	-2.483315	-1.136684	-5.681643	
Mean dependent	0.002086	0.025942	-0.010875	0.011416	
S.D. dependent	0.039165	0.061803	0.123644	0.022881	
Determinant resid covariance (dof adj.)		8.80E-12			
Determinant resid covariance		6.28E-12			
Log likelihood		534.3827			
Akaike information criterion		-13.68602			
Schwarz criterion		-12.81421			

Source: Eviews 7.0 Micro Software, LLC

CHART 2: IMPULSE RESPONSE FUNCTIONS

Response to Cholesky One S.D. Innovations Accumulated Response to Cholesky One S.D. Innovations



source: Eviews 7.0 Micro Software, LLC

Box 1

VARINSTALL FINANCING PLANS AND THE WORKERS' BANK OF TRINIDAD AND TOBAGO LIMITED

During the late 1970s and early 1980s, the Workers' Bank introduced an innovative housing finance product in order to increase its market share in real estate financing. The product, called VARINSTALL MORTGAGE, was marketed by the bank in three variants. These were as follows:

- **Guaranteed Instalment Mortgage Finance Plan (VARINSTALL MARK I):** This plan allowed for loan amortization, with a deferment of repayment of principal, an initial part payment of interest, and a variable instalment that increased over the life of the mortgage according to a pre-determined index.

- Base Rate Mortgage Finance Plan (VARINSTALL MARK II): Under this plan, monthly mortgage instalments were calculated according to a base rate which was lower than the actual prevailing lending rate during the initial amortization period. This plan therefore allowed for lower monthly instalments when compared to mortgage at actual lending rates.
- Variable Interest Rate Mortgage Finance Plan (VARINSTALL MARK III): This plan provided for loan amortization using interest rates that would vary annually over the unexpired term of the mortgage. The rate applied under this plan changed on the basis of the prime lending rate prevailing in the banking system.

Like any product, VARINSTALL MORTGAGE schemes, carried certain benefits. For instance, a key benefit was that VARINSTALL enabled relatively lower mortgage instalments than other mortgage products. This product improved the affordability of many households who sought to obtain financing to acquire housing. Through this product the Workers' Bank became a key lender in housing finance in Trinidad and Tobago.

The VARINSTALL MORTGAGE schemes also carried major risks which were not properly understood by the Workers' Bank. For instance, the provision for escalation of monthly instalments to increase based on the assumptions that property prices and households incomes would continue to rise annually. The collapse in energy prices, and the onset of a major recession in the domestic economy in the latter half of the 1980s placed immense distress for the Workers' Banks as borrowers were unable to service their mortgages.

Further, weak management practices in terms of a poor selection of borrowers and an over concentration to bridge finance and commercial mortgages aggravated the financial distress faced by this bank. During the recessionary period many loans granted to the real estate sector went into default, putting the bank in a chronic liquidity problem. The Central Bank of Trinidad and Tobago eventually intervened in the affairs of this entity in April 1989.

Source: Central Bank of Trinidad and Tobago, 2007 Public Education Document, "The Residential Mortgage Market in Trinidad and Tobago".

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