USE OF LOAN-TO-VALUE RATIO AS A MACROPRUDENTIAL TOOL IN THE MITIGATION OF RESIDENTIAL PROPERTY PRICE VOLATILITY

ABSTRACT

Property price cycles and their impact on financial stability have earned newfound attention following the global financial crisis of 2007/2009. Financial stability is key to overall macroeconomic performance, and calls for greater coordination between traditional monetary policy and macroprudential tools.

The literature review reveals that there is a distinct relationship between the property market, as a source of economic cyclicality, and the financial system. This paper documents the experiences of several countries and examines the use of the loan to value ratio (the ratio of the maximum permitted loan against the value of the property) as an indicator in mitigating systemic risks that can arise from property price volatility.

Trinidad and Tobago's financial system continues to be dominated by the banking sector in which mortgage lending represents a large portion of the banks' loan portfolio. The regulatory authority has only recently begun to formally track the use of the loan to value ratio. However, our banking system appears to be conservative in their lending practices while adhering to their respective credit policies. Recognizing the data limitations in housing related variables, it is recommended that we continue to enhance the data collection process and have more focused analysis on relevant housing data. This will allow for the introduction and implementation of new types of data from a regulatory standpoint to better aid in monitoring on both a microprudential and macroprudential level.

Keywords: Macroprudential, financial stability, loan-to-value, mortgages, policy, systemic risk

JEL Classifications: E58, G21, G28

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Introduction

History has been plagued by real estate bubbles in major developed economies .Work by Reinhart and Rogoff (2009a) found that "house price increases are indeed common prior to banking crises" with 40 per cent of house price booms followed by busts (IMF 2011). The unsustainable appreciation in property prices was featured prominently in the 1997-1998 Asian financial crisis, the collapse of Japan's property market in the early 1990s as well as the recent 2007-2009 financial crisis (Kuttner and Shim, 2012).

In the most recent crisis, the downturn in the United States residential real estate market triggered severe illiquidity, and ultimately, a credit crunch in the financial sector which in turn led to worldwide recession, with some economies yet to experience full recovery and record growth of pre-crisis levels. This shows that the volatility of the housing market can be damaging to both the real economy and financial stability with many banking crises associated with the booms and busts of property prices (IMF, 2014).

Emerging trends indicate that central banks and financial regulators across the world have placed much more emphasis on housing market development given its far reaching implications for financial stability. The crisis has underscored that increased coordination between traditional monetary policy and macroprudential policy can potentially reduce systemic risks. Further, while microprudential supervision contributes to some measure of financial stability, without an overarching macroprudential framework, the financial system remains blind to systemic imbalances. Policymakers are of the view that waiting on the sideline to pick up the pieces after the storm has passed, is not the best approach bearing in mind the formidable costs such a response triggered in the last crisis. They are more favourable to pre-emptive policy actions that could either alleviate real estate bubbles, or at least contain the potential damage to the financial sector and the broader economy (Igan and Kang, 2011).

In the search for an improved defensive mechanism to deal with real estate booms and busts, macroprudential policy tools in the areas of credit, liquidity and capital have been introduced. Since the crisis, an increasing number of emerging and advanced economies have implemented macroprudential tools, often focused on systemic risk in the mortgage and housing markets (including Canada, Hong Kong, Norway, Singapore, Sweden) (IMF, 2013). Within the macroprudential toolkit, the main housing-related measures include loan-to-value (LTV) ratios, debt-to-income (DTI) ratios, imposition of higher risk weights on mortgage loans in the calculation of capital-adequacy ratios, increased loan loss provisions on mortgage loans, and housing-or land-related taxation (Zhang and Zoli, 2014).

The literature review reveals that macroprudential instruments have been used most extensively in the continent of Asia than any other region, with specific emphasis on housing-related measures. More specifically, the introduction of caps on the LTV ratios have been the most actively used tool, as several Asian economies experienced overheating in their housing markets within the last ten years. Post-crisis, many countries have adopted or are considering to adopt, maximum LTV ratios on mortgages. This paper will examine the effectiveness of the LTV ratio (the ratio of the maximum permitted loan against the value of the property) as a tool in mitigating systemic risks arising from property price volatility in various countries.

The rest of this paper is structured as follows. Section 2 provides a brief description of the evolution of macroprudential policy. Section 3 documents specific country experiences with stylized facts on the use of LTV ratios in these regions while Section 4 paints a picture of Trinidad and Tobago's residential housing market and the current use of the LTV limits in our local banking system. Section 5 concludes with broad recommendations for implementation of the LTV ratio as a macroprudential tool within the local financial system to address procyclicality.

Section 2

Against the backdrop of the global financial crisis of 2008/2009 which shook the foundation of many economies across the globe, many central banks have re-defined their roles in stability. The depth and length of the financial crisis illustrated the glaring importance of maintaining the mortgage market, especially during periods of growth, due to the strong interconnectedness of the global financial markets. The crisis brought to the fore the pivotal role of financial stability as it became evident that monetary/price stability in itself, even though optimally implemented, were inadequate to ensure financial stability and thus macroeconomic stability. Thus, it has echoed the need for a macroprudential framework to address the systemic stability of the financial system beyond the sole grasps of monetary policy (Galati & Moessner, 2011).

Monetary Policy

In pre-crisis times, the main tool used by most central banks was monetary policy with the focus of maintaining price stability. Inflation-targeting was at the forefront where through the use of monetary policy instruments such as short term interest rates it was deemed adequate for macroeconomic stability and by extension financial stability[2].

[2] Financial stability can be defined as "a condition in which the financial system – comprising financial intermediaries, markets and market infrastructure – is capable of withstanding shocks and the unravelling of financial imbalances, thereby mitigating the likelihood of disruptions in the financial intermediation process which are severe enough to significantly impair the allocation of savings to profitable investment opportunities" (ECB (2007).

In macroeconomic theory, increasing interest rates would make borrowing more expensive and reduce the demand for loans by consumers. It is expected the demand for mortgages would decrease since with higher interest payments it will make mortgages less affordable to the masses. Therefore, to some extent, monetary tightening reduces leverage in the financial sector. However, monetary policy is a blunt and costly tool when dealing with real estate booms, since increases in interest rates to curtail the boom would require significant costs in terms of output gap and desired inflation rates (Crowe et al, 2011). Between the period 2002 and 2008, Australia increased its policy rate by 300 basis points while Sweden increased its rate by 325 basis points (Hwa Se, 2013). Despite these interest policy rate adjustments, house prices in real terms increased by 80 per cent between 2000 and 2007. This is clearly indicative that a traditional Taylor rule was not always effective in tempering the boom-bust cycles in the real estate market. In several countries, dangerous financial imbalances were created despite low inflation and small output gaps (IMF, 2013b). It was evident that additional tools were needed to complement monetary policy in countercyclical management. This is when macroprudential policy tools shot to the forefront and a new paradigm emerged post crisis, the marriage of monetary and macroprudential policy complementing each other to achieve price stability and financial system stability.

Fiscal Policy

It is believed that fiscal tools (such as transaction taxes, property taxes and mortgage interest rate deductibility) may be taken into consideration by a consumer when making the decision to invest in real estate. However, it should be noted that the relationship between tax treatment of residential property and real estate cycles is inconclusive (Crowe et al, 2011). Technical as well as political problems specific to the country may complicate implementation since most countries separate tax policy from monetary and financial regulation policies. Thus, it makes it difficult to implement changes in tax policies as part of a cyclical response with financial stability as the main objective (Wachter, Cho, & Tcha, 2014).

- Transaction Taxes[3]: The transaction tax on housing is meant to weaken a house-price spiral however, the ability of transaction taxes to contain exuberant behavior in house prices may be compromised if homebuyers do not respond to these taxes fully. They may consider these taxes to be an acceptable cost for an investment with high returns and consumption values. While in theory, transaction taxes act as instruments to smooth house prices in the residential housing market, empirical studies have shown that transaction taxes did not reduce the growth in the real estate bubbles; rendering transaction taxes ineffective (Aregger, Brown, & Rossi, 2012).

[3] These can be capital gains tax or estate taxes

- Property Taxes: This is a tax levied on real estate by the government based on the value of the property and is another instrument aimed at burdening the acquisition of property. In reality however, property taxes are determined independently of property value, with the tax rate adjusted to keep government revenue constant even in times when prices are changing dramatically.

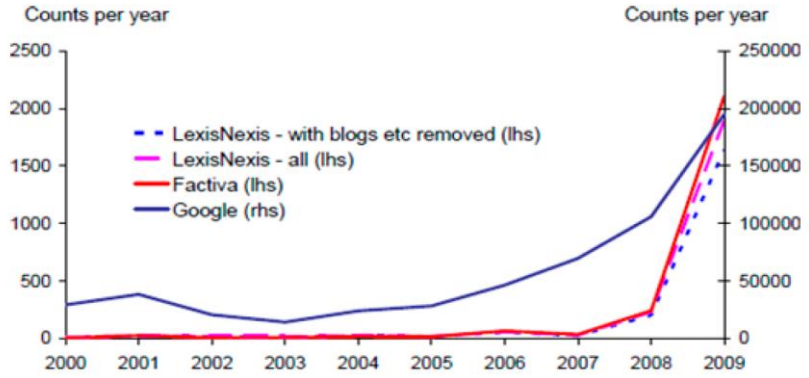
- Mortgage Interest Deductible: This allows tax payers who own their own homes to reduce their taxable income by the amount of interest paid on the loan which is secured by their principle residence (or a second home) (United States, Netherlands, Switzerland). Ideally, the mortgage interest deductible is aimed at encouraging people who rent to switch to buying houses which increases home ownership. Evidence suggests however, that the mortgage interest deduction does little if anything to encourage homeownership. Instead, it serves mainly to raise the price of housing and land and to encourage people who do buy homes to borrow more and to buy larger homes than they otherwise would. This inevitably increases the demand for houses and raises house prices; rendering the mortgage interest deductible ineffective in mitigating house price bubbles (Gale & Gruber, 2007).

These instruments, while aimed at smoothing housing price bubbles, cause distortions in evaluating property values and timing of transactions by promoting house price speculation. As a result, these measures defeat the purpose of correcting the disequilibrium in the market.

Macroprudential Policy

While microprudential policy examines financial system risks at an institutional level, its complement, macroprudential policy focuses on system-wide risks. The term "macroprudential" began to publicly be used by the Bank of International Settlements and other bodies by the mid-1980s. However, the word has risen from 'virtual obscurity to extraordinary prominence' in the wake of the recent financial crisis (Clement, 2010 as represented in Figure 1 below).

Figure 1: Increasing use of the word 'macroprudential'



Source: Galati and Mossner 2011

Macroprudential policy has been defined as the use of primarily prudential tools to limit systemic risk – the risk of disruptions to the provision of financial services that is caused by an impairment of all or parts of the financial system, and can cause serious negative consequences for the real economy (IMF, 2013). As a result, strengthened and/or new macroprudential policy[4] tools have been created to address systemic risk in the financial sector and impact capital flows. The toolkit can be divided into three main groups of measures: credit, liquidity and capital. The literature tells us that macroprudential tools can be neatly categorized into 3 broad classes:

1. Credit-related : caps on the LTV ratio, caps on the DTI ratio, limits on foreign currency lending, mandatory insurance for riskier loans and caps on credit volume or credit growth.
2. Liquidity-related: limits on net currency position or net currency mismatch, limits on maturity mismatch, limits on funding gaps, core funding requirements and prudential stability levies/taxes.
3. Capital related : countercyclical or time-varying capital requirements, dynamic or time-varying.

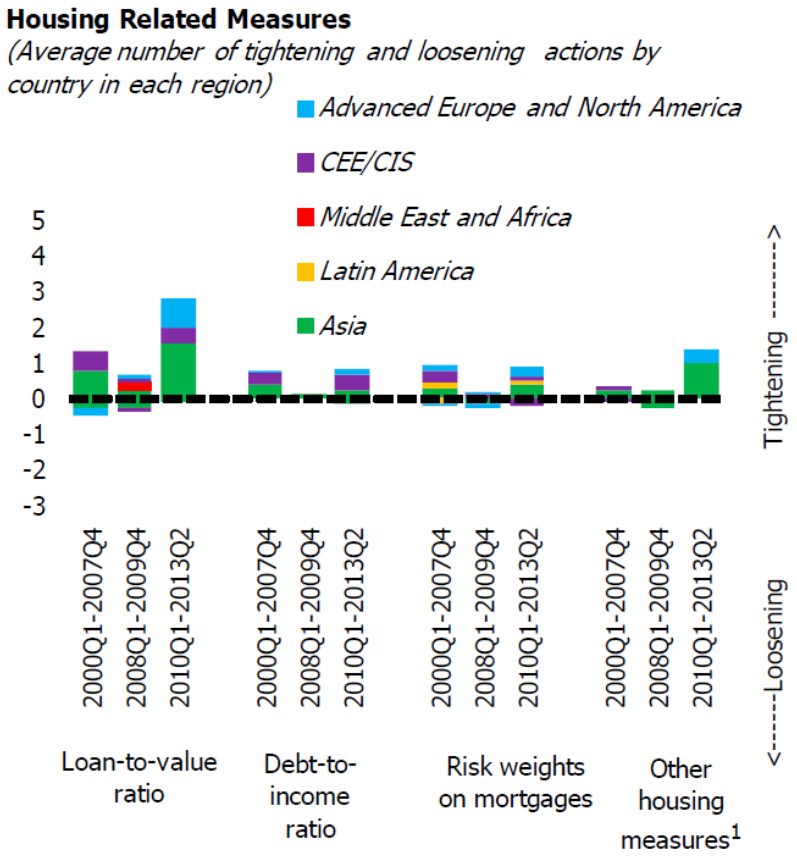
The objective of these tools is to mitigate against risks emanating from excessive credit growth, excessive private sector leveraging, systemic liquidity risk and large or volatile capital flows. One advantage of macroprudential tools is that it allows policymakers to design and target narrow objectives directly. For instance, the authorities can craft the macroprudential policy tool in such a way to target only the real estate (housing) market and the use of bank leverage in property

[4] The objective of macroprudential policy is to limit the risk of widespread disruptions on the economy as a whole (BIS-FSB-IMF, 2011) and to strengthen the financial system (BIS 2010)

purchases. The other advantage of macroprudential tools is that it can be implemented at lower costs than monetary and fiscal policies.

Accordingly, the link between macroprudential tools and the mortgage market is straightforward and of capital importance, since a large number of economic crises have originated in the real estate sector where housing prices booms seem to be recurring (Rubio et al, 2014). In terms of macroprudential housing related measures and its use across various regions, research indicates that caps on the LTV ratio are by far the most popularly used tool (See Figure 2 below).

Figure 2: Adjustments to Housing Related Measures by region for the period 2000-2013



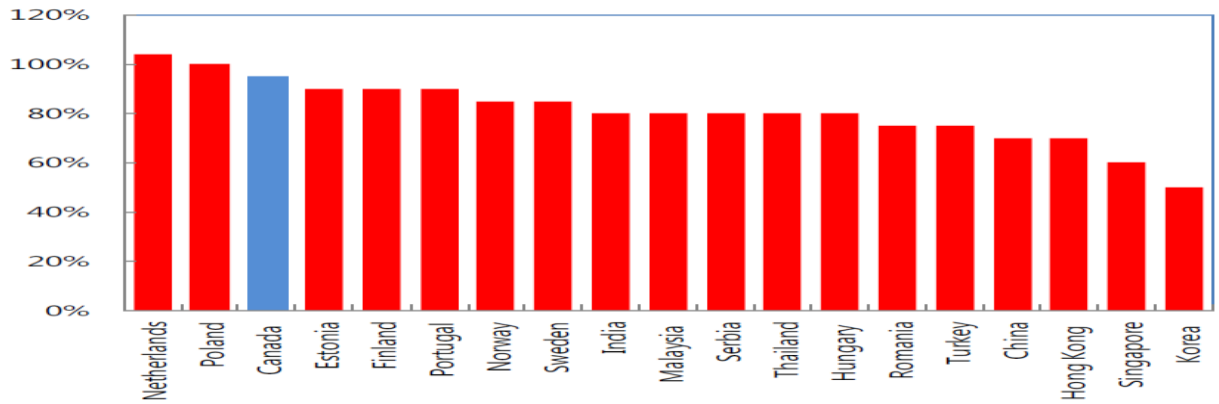
[1] Include provisions on housing loan requirements, housing/land related taxation, and limits on adjustable rates component of mortgages.

Source: Zhang and Zoli, 2014

For the purpose of this paper, research was primarily conducted on the most popular macroprudential house-related measure in Asia, **caps on the LTV ratios**. By definition, the LTV ratio introduces a cap on the size of a mortgage loan relative to the value of a property, thereby imposing a minimum downpayment (IMF, 2013). These caps tend to start from a 'normal' level

and then tightening impositions of 10 or 20 percentage points are applied depending on the business cycle. It is specifically targeted to slow credit growth, house price inflation and dampen bank leverage without affecting other sectors of the economy. It also attempts to reduce default rates and boost recovery values when the cycle is on the upswing. The literature highlights that many countries use the LTV ratio as a means of stabilizing the economy during boom and bust periods, especially as it pertains to the housing market (Hong Kong, Korea, Singapore, New Zealand, Sweden, Canada) as seen in Figure 3 below. The evidence suggests that the LTV ratios can affect house prices and aggregate demand and are being adjusted during the credit growth cycle at the discretion of the policymaker. Recognizing that this ratio in itself cannot address all the elements of risk in a transaction, other policies may be used to complement the LTV ratio namely, limits on loan to income, loan concentration and increases in risk weights for mortgages in the calculation of regulatory capital.

Figure 3: Individual countries' LTV ratio in effect as at 2013



Source: Authorities' websites via *Krznar and Morsink 2014*

Various studies have been done to examine how the LTV ratios affect house price movements. The literature reveals that the higher the LTV, the more volatile the movements in house prices (Lament and Stein (1999) and Almeida et al. (2006). Crowe et al (2011) highlights that there is a positive correlation between LTV at origination and state level house price appreciation in the United States. Wong et al. (2011) pointed out that low LTVs have the potential to reduce delinquencies from economic downturns and real estate busts. Using data from 49 emerging and advanced economies, Ahuja and Nabar (2011) suggests that LTV limits slow the growth in property prices. Kuttner and Shim (2014) demonstrated that changes in housing measures including caps on LTV ratios significantly affects housing credit growth. The main objective of the use of LTVs is to enhance financial stability and provide a clear signal of concerns by the regulators to the institutions under their purview and the wider public.

Section 3

The literature informed that the emerging Asian countries were the forerunners in the use of the LTV ratio and has made use of this tool, long before the most recent financial crisis. It should be noted though that due to the short history on the use of this tool and that it is now gaining in popularity across other regions other than Asia, there is little empirical evidence on its effectiveness. The experiences of Korea, Hong Kong, Singapore, Sweden, Canada, New Zealand and England will be investigated to determine the effectiveness of this macroprudential tool, the LTV ratio, to changes in the real estate market and its ability to keep the market stable.

Since introducing LTV limits in 2002, the Republic of Korea has actively used the LTV ratio along with other macroprudential tools as it relates to housing measures to stabilize house prices. In the first major housing cycle in Korea, a cap on the LTV ratio of 60 per cent resulted in a 20 per cent decrease in house price appreciation on a year-on-year basis to 9 per cent in just 6 months. The Korean government adjusted the cap on LTV's thereafter as house prices accelerated again even so far as having differentiated caps based on specific parameters of the mortgage loan (for example, the maturity of the loan, housing price and location). Despite the relatively recent introduction of LTV ratios as a targeted policy tool, its use has proven successful thus far.

In the case of Hong Kong, the LTV ratio has been in use as a macroprudential tool to maintain banking stability for almost 20 years. Tighter caps have been placed on luxury properties, investment properties and borrowers with sources of income from abroad. Hong Kong's experiences with the use of LTV's can be segregated in four (4) distinct phases (See Appendix 1) which were successful in slowing house price inflation and reducing systemic risk in the property markets. This was evident in the low mortgage delinquency rate of 1.4 per cent seen when house prices plummeted by 66 per cent after the Asian crisis. The case of Hong Kong therefore informs us that policy makers, who are unable to conduct autonomous monetary policy, can employ the LTV ratio as an alternative to guard against housing market bubbles.

Singapore's use of macroprudential policies increased significantly after the global financial crisis when there was coordinated use of different policy tools for an effective and coherent response to housing market pressures. The evidence indicates that the LTV ratio has been responsible for cooling down, what once was a highly exuberant real estate market. The results were that the share of borrowers with single mortgages increased and speculative transactions decreased. Singapore also loosened its LTV during the Asian Crisis as macroeconomic conditions deteriorated. Post-crisis, European nations have placed more attention on LTV caps as a means of cooling volatile housing prices. In Sweden, during the period 2000-2010, residential mortgage

lending increased by more than 15 per cent. In October 2010, Sweden introduced the use of LTV ratio limits (a cap of 85 per cent) to address the vulnerability posed by highly leveraged households. This intervention was able to stop the trend of rising LTV ratios and level-off house price inflation. However, this was a temporary effect because credit growth and household indebtedness continued to increase after 2011 and Sweden is considering legislating that those taking out mortgages over 50 per cent of the value of a property to pay the mortgage down over a specific period of time.

The Reserve Bank of New Zealand has implemented restrictions on high LTV ratios effective October 01, 2013. The instituted "speed limits" restrict the share of new high LTV lending that banks may undertake e.g. only 10 per cent of new lending permitted with an LTV above 85 per cent, 55 per cent with an LTV above 90 per cent. This would allow banks to provide some high LTV mortgages to creditworthy borrowers and reduce the incentives for disintermediation. Another option employed is "outright limits" on the proportion of the value of the residential property that can be borrowed e.g. zero new residential property lending permitted with an LTV ratio above 90 per cent. Further, the regulatory framework of New Zealand was augmented to require banks to hold more capital on high LTV lending, founded on the Basel II framework, thereby aligning capital requirements with the risk associated with banks' exposures. Given that New Zealand is at the infancy stage in the implementation of LTVs, it is too early to determine the level of success with this initiative.

In the case of England, by November 2013, the number of high LTV mortgages approved had doubled year-on-year, due to loans being made available to borrowers with small deposits. For the same period, house prices increased by 4.9 per cent year-on-year. Given this development, mortgages were identified as the single largest asset class on banks' balance sheets and the largest liability to UK's households (FPC Statement September 2014). To mitigate any buildup of risks, the FPC recommended to the PRA and FCA to impose a limit on the proportion of UK residential mortgage lending above a given threshold (15 per cent limit on mortgage loans where the loan to income is at or greater than 4.5). On October 1, 2014, the Bank of England put the FPC's recommendation into effect. However, to avoid excessive burdens on financial institutions, the PRA considers that it is appropriate to extend the de minimis threshold to apply on either a value or volume of lending basis. This means that lenders who extend less than £100 million in value or fewer than 300 in number of relevant regulated mortgage contracts(6) each year fall outside the scope of the policy. It is believed that with time, England will experience 'cooling' of excessive credit growth and household debt.

In the 2000s, Canada experienced rapid growth in house prices, residential mortgage credit and consumer credit. Between 2000 and 2008, mortgage credit expanded on average by almost 9 per

cent per year. Currently in Canada, residential mortgages represent 30 per cent of banking system assets. Financial institutions are now mandated by law to insure residential mortgage loans when the LTV ratio is in excess of 80 per cent (less than 20 per cent down payment). Mortgages with LTV ratios less than 80 per cent, may be insured, but this is optional. The insurance component therefore protects financial institutions against possible defaults on high ratio loans. Further, post financial crisis the maximum LTV ratio was lowered on refinancing loans and those properties bought for speculative means. Empirical evidence indicates that a 1 percentage point reduction in the maximum LTV ratio lowers annual mortgage credit growth by about ¼ to ½ percentage point (Krznar and Morsink, 2014). The success of Canada's attempts is exemplified by its mortgage arrears rate[5], which is very low and stable since the beginning of the global financial crisis.

The few country cases examined illustrated the flexibility of the LTV ratio. This is a positive feature since it can be repeatedly tightened and loosened based on economic fundamentals and the specific country objectives. As easy as it seems for countries to adjust its LTV ratios, bear in mind that calibration of this macroprudential tool maybe be very complicated given the inexperience of most jurisdictions with this type of tool. They will also have to be aware of how the adjustment of this tool will affect other policy decisions which it will take.

Overall, the LTV ratio can curb expectations and discourage potential speculators, thereby being an effective tool to tame real estate booms and contain the associated risks (Igan and Kang 2011*)*.The following Table 1 summarizes LTV ratio decisions taken by a sample set of countries.

[5] The ratio of all loans that are more than 90 days due to the number of outstanding insured loans.

Table 1: Examples of Countries that instituted LTV ratios to manage real estate mortgages pro-cyclicality

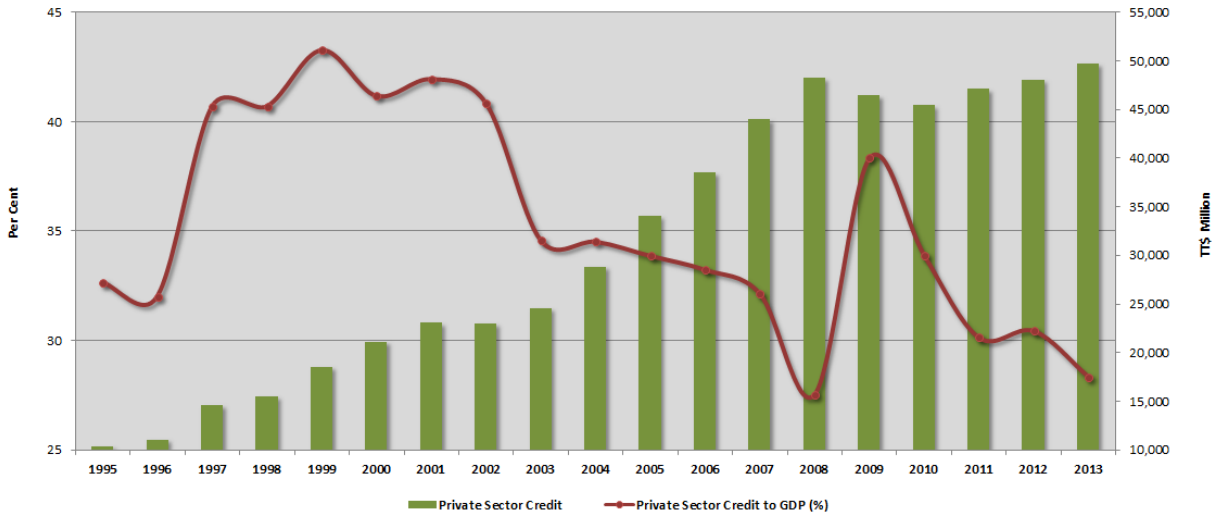
COUNTRY	USE OF LTV RATIO AFTER THE GLOBAL FINANCIAL CRISIS
Korea	The use of LTV and DTI in effect since early 2000 and have since been tightened four times and loosened once since 2002.
Hong Kong	Adjustments in the LTV ratio were pre-crisis and rules on LTV and DTI that have been in effect since the early 2000s have been tightened together with the introduction of mandatory mortgage insurance.
Singapore	The use of LTV and DTI in effect since early 2000. In 2010, LTV caps were reduced from 90 per cent to 80 per cent for all borrowers and reduced to 70 per cent and later to 60 per cent for borrowers with one or more outstanding housing loans. Non-individual buyers faced an LTV ratio of 50 per cent.
Sweden	Introduction of the maximum LTV ratio of 85 per cent for mortgages in 2010.
Canada	In 2006, 0 per cent down-payment and 30 years amortization on loans was introduced. In October 2008, minimum down-payment requirements for insured loans were increased from 0 to 5 per cent, the maximum LTV for insured loans was reduced from 100 per cent to 95 per cent and 85 per cent on refinancing loans and loans to purchase property. Maturity of mortgages with more than 80 per cent LTV capped at 25 years and mandatory insurance for high LTV loans.
England	The FPC made recommendations to the PRA & FCA. No formal position yet taken.
New Zealand	LTV restrictions took effect October 1, 2013. Tiered LTVs (speed limits and outright limits) are offered allowing bank to cater to all type of borrowers.
Indonesia	Imposed lower LTV ratios on 2nd and 3rd mortgages to curb loan growth & property speculation (September 2013).
Netherlands	Imposed 1 per cent point annual reduction in LTV ratio cap on new mortgage loans to 100 per cent by 2018 (2013).
Finland	In March 2010, the authorities recommended (not binding) a maximum LTV ratio of 90 per cent and maximum 25 years of amortization in calculation of mortgage affordability.
Norway	In March 2010, LTV limit set at 90 per cent (not a hard cap) where LTVs on home equity loans should generally not exceed 75 per cent. In December 2011, LTV set at 85 per cent, lowering the maximum LTV on home equity loans to 70 per cent.
Turkey	In January 2011, Residential mortgage loans LTV set at 75 per cent, mortgages on commercial real estate properties were limited to LTV of 50 per cent.
China	In April 2001, maximum LTV ratios for mortgages were reduced to 80 per cent. In March 2005, LTV ratio set at 70 per cent for properties in cities or regions with excessively fast housing price increase (decision up to banks). In June 2006, maximum LTV ratio was reduced from 80 per cent to 70 per cent for housing larger than 90m^2 excluding purchases for own use by individuals. In September 2007, LTVs were lowered to 60 per cent for second mortgage loans but required minimum down payment ratio higher for third mortgage loans. In October 2008, LTV was raised to 80 per cent. In Apr 2010, the LTV on primary homes was lowered from 80 per cent to 70 per cent for the first home buyers of apartments over 90 m^2 and to 50 per cent on second homes. In September 2010, the LTV ceiling was lowered to 70 per cent for all first home buyers. In January 2011, the LTV cap was lowered to 40 pe4r cent for mortgages of second homes, In Mar 2013 (announced), LTV for mortgages of second homes were lowered.
Malaysia	In Nov 2010, maximum 70 per cent LTV limit placed on the 3rd outstanding housing loan. In Dec 2011, residential property loans taken by non-individual borrowers were also subjected to an LTV ratio of 60 per cent.

Sources: Crowe et al & Krznar & Morsink 2014

Section 4

In Trinidad and Tobago, the banking sector plays an important role in the economy and can be heavily exposed to downside risks with boom-bust cycles in property prices. A closer look at the banking sector of Trinidad and Tobago's TT$93 billion economy shows that the assets of commercial banks accounted for 76.2 per cent of GDP in 2013, up from 50 per cent of GDP in 2008. Domestic credit to the private sector has more than doubled during the period 2000 to 2013 (Figure 4) accounting for, on average, 34 per cent of GDP. The rate of increase in credit slowed considerably since 2009 when compared to that of nominal GDP resulting in an overall downward trend in the ratio from 2009 to 2013.

Figure 4: Domestic credit to private sector (per cent of GDP) in Trinidad and Tobago



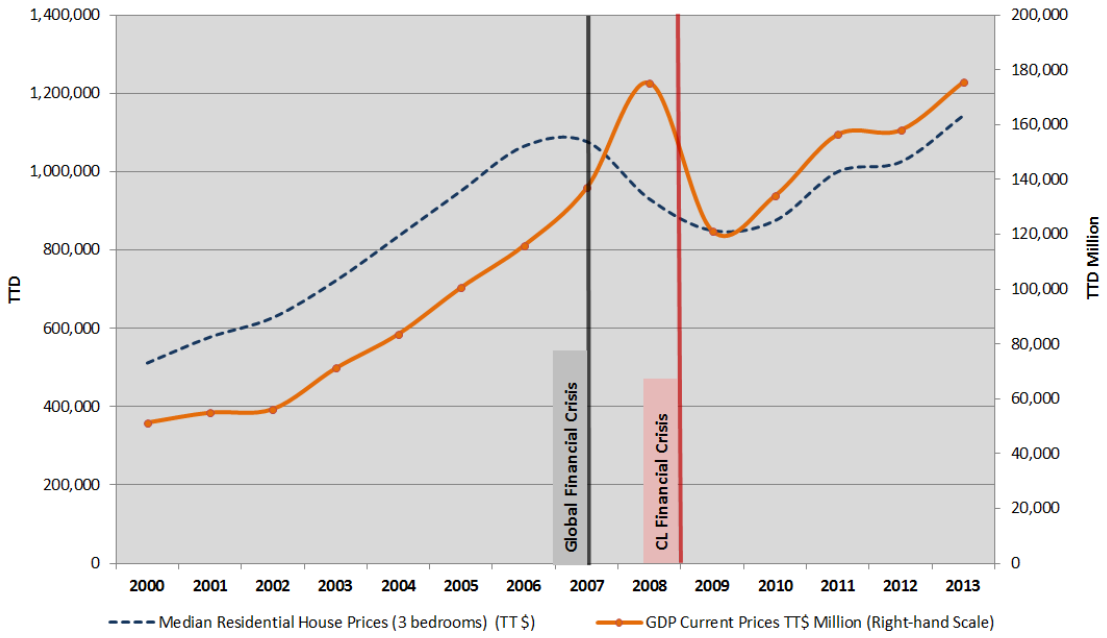
Source: The World Bank and Central Bank of Trinidad and Tobago

Despite being constrained by limited information, existing research[6] on the housing market of Trinidad and Tobago has identified various factors that can affect developments in the real estate sector as a small, open energy dependent economy. These factors range from the demand for 'scarce' land for housing as it competes with other uses and the role of the energy sector. This paper[6] posits that "the price of housing is very highly correlated with the international price of oil" but given the size of the energy sector, the wealth shock as a result of an increase in the price of oil generates Dutch Disease problems. The energy sector accounts for approximately 38.5 per cent of GDP (2014-preliminary estimate) and its employees represent, on average, a mere 3 per cent of the labour force. While the wealth shock as a result of high oil prices may be concentrated to the energy sector, the impact on house prices is said to be incorporated almost immediately given its high, positive correlation. House prices tend to move in tandem with GDP which also has a strong, positive correlation. A look at Figure 5 shows a change in trends from the onset of

[6] Housing Finance Policy under Dutch Disease Pressure: The Mortgage Market in Trinidad and Tobago (IDB, 2011)

the global financial crisis as oil prices fell from its peak of USD145.18 in July 2008 to as low as USD33.98 in February 2009. In addition to the dip in oil prices, Trinidad and Tobago experienced its own crisis with the fallout of the CL Financial Group in January 2009 which cost the country over $20 billion dollars. GDP contracted by 3.4 per cent year-on-year in 2009 while median house prices experienced a slight uptick of 2.9 per cent over the same period following an 8.6 per cent year-on-year decline in 2008.

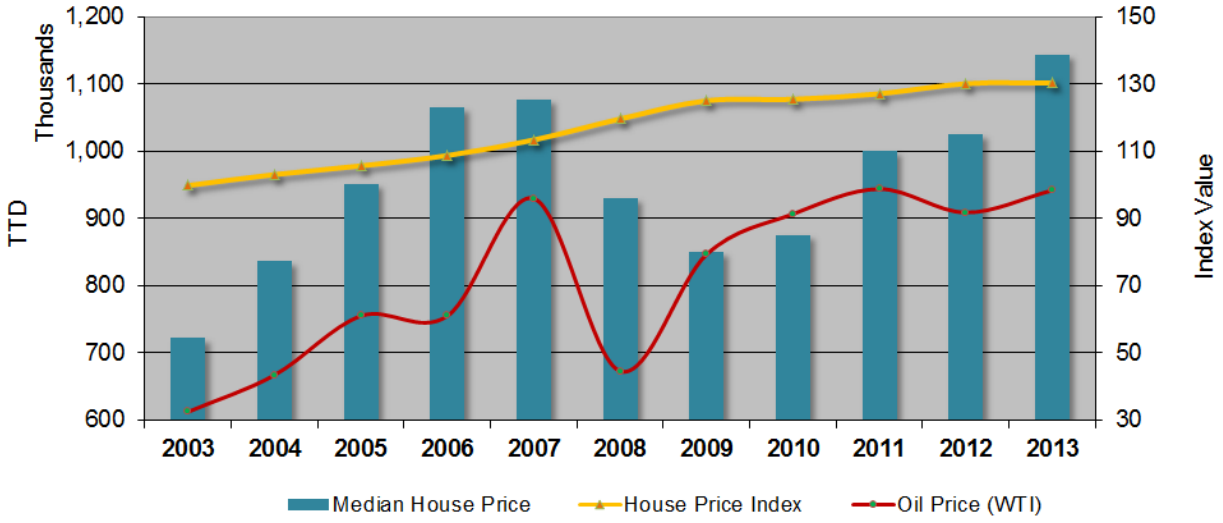
Figure 5: Trinidad and Tobago: House Prices vs. GDP (2000-2013)



Source: Central Bank of Trinidad and Tobago

The period 1991 to 2006 is commonly referred to as the boom period of the real estate industry with the median house price rising by over 400 per cent as the economy, as measured by nominal GDP, increased by a similar rate. As at 2013, the median house price (3 bedrooms) was TT$1.1 million, 35 per cent higher than the first dip seen in 2008 (based on the 10-year period 2003-2013) and over 100 per cent more than the median house price in 2000 (Figure 6).

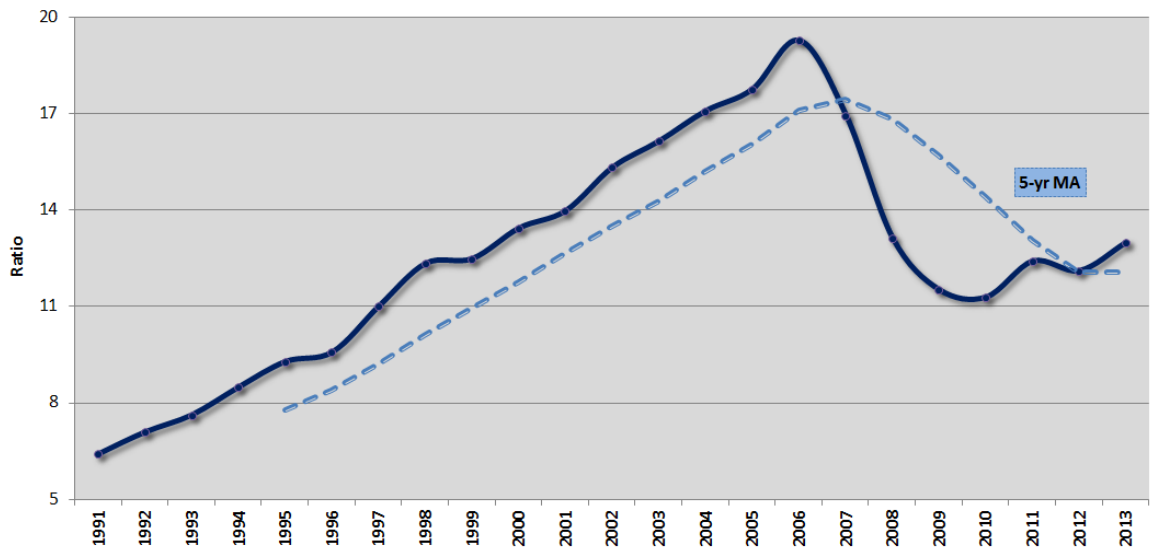
Figure 6: Median House Price vs. House Price Index in Trinidad and Tobago vs. Oil Price (WTI)



Source: Central Bank of Trinidad and Tobago

With median house prices at a 10-year high as at 2013, the sustainability of these prices increases will be briefly examined as measured by the ratio of house prices to wages. As seen in Figure 7, the ratio of house prices to wages fell sharply from its peak in 2006 as house prices fell and was 13 times as much as the average annual income in 2013. This is marginally higher than the 5-year moving average of 12 times.

Figure 7: House Prices to Wages in Trinidad and Tobago



Source: Central Bank of Trinidad and Tobago

Owning a home is often thought of as a significant milestone in one's life and in some cases one's largest investment. Trinidad and Tobago's investment environment has been one of 'low interest

rates' and 'excess liquidity' especially following the global financial crisis. In 2009 when the Trinidad and Tobago economy contracted for the first time in the period 2003-2013, the local stock market as measured by the Trinidad and Tobago Composite Price index (TTCI) posted negative returns of 14.2 per cent and 9.2 per cent in 2008 and 2009 respectively.

A simple Least Squares regression was estimated using a total 140 monthly data points from 2003 to 2014 (See Appendix 2). It examined the extent to which house prices are driven by the following variables namely, total real estate mortgages (REM) in the banking system, the TTCI and the oil price (OP) (See Table 2). Using White Heteroskedasticity consistent standard errors or robust standard errors, the following results were found:

Table 2: Estimation Results

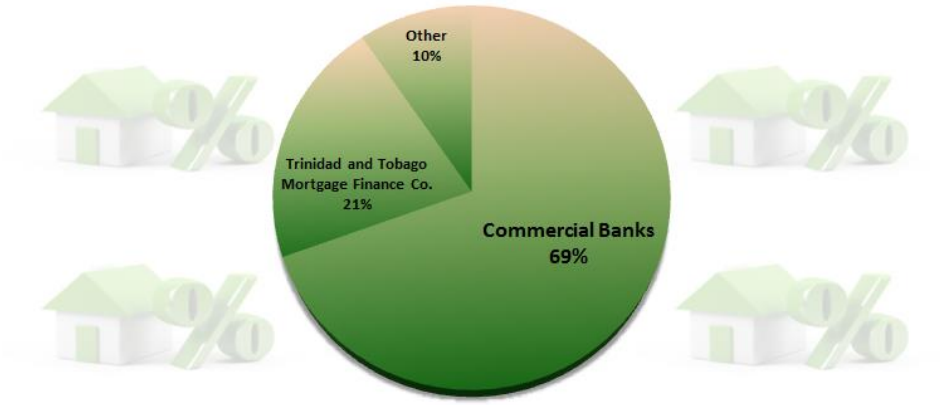
Variable	Coefficient
C	3.109254*
LREM	0.202648*
LTTCI	-0.039582*
LOP	0.025947**

Source: Central Bank of Trinidad and Tobago

Where * and ** indicates significance at 1 per cent and 5 per cent

Based on the table above, it can be seen that all variables used in estimation were significant and conformed to the a priori expectations. Real estate mortgages had the largest impact on houses prices. If real estate mortgages were to increase, an increase in house prices of 0.2026 can be expected. Further, the empirical result indicates the inverse relationship between the stock price movements and house prices. If there is a decrease in the stock price by one unit it is expected that there will be an increase of 0.039 in house prices. Therefore, we can conclude that the attractiveness of investing in real estate increases when there are low returns on the stock market.

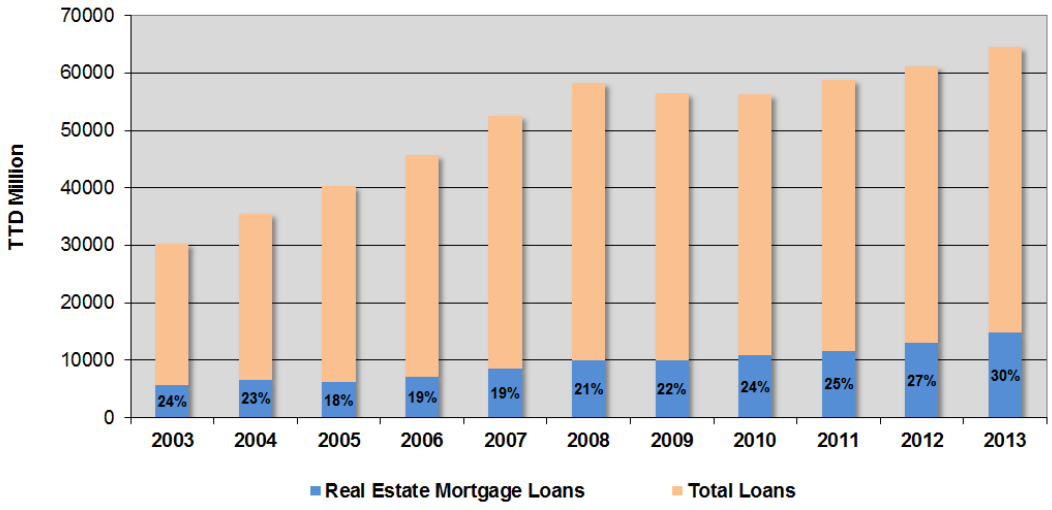
Figure 10: Composition of Mortgage Loans by Institution as at September 2014 in Trinidad and Tobago



Source: Central Bank of Trinidad and Tobago

Data show that the number of mortgage approvals for the purchases of existing homes has risen by over 600 per cent during the period 1992 to 2013. Figure 8 shows that the majority of mortgage loans come from the commercial banks which account for 69 per cent of total market share. On average, real estate mortgage loans account for approximately a third of total loans of the banks and non-banks (Figure 9). Of the $49 billion in loans from banks and non-banks issued in 2013, around $15 billion was for real estate mortgage loans which were over 150 per cent higher than the total value of real estate loans issued in 2003.

Figure 9: Real Estate Mortgage Loans/ Total Loans in Trinidad & Tobago

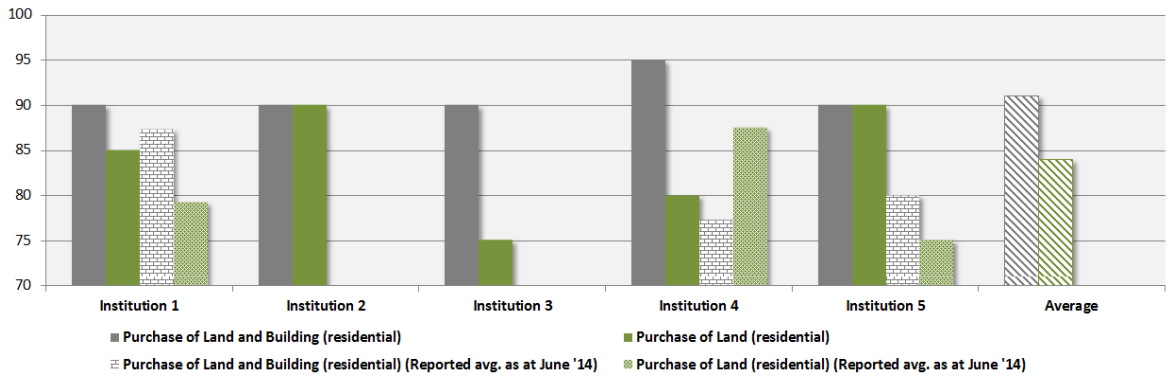


Source: Central Bank of Trinidad and Tobago

A booming housing sector can be positive for economic development but an unsustainable rise in house prices as history has shown, can be detrimental to the economy. Its link to financial stability impacts various key elements of an economy from the construction industry to household budgets and overall wealth. The systemic risk of a housing bust as so vividly seen in the more advanced economies following the global financial crisis has led to more active uses of macroprudential polices to contain house price booms. The macroprudential tools usually employed to do this, as mentioned earlier, are limits on loan-to-value ratios and debt-service-to-income ratios and sectoral capital requirements.

The aim of this paper is not to deduce that T&T is in a housing boom but to ensure that the proper tools are in place to mitigate such risk by observing and learning from the experience of others with focus on the use of LTV's.

Figure 10: LTV Ratio applied on Residential Property by Institution in Trinidad & Tobago (as at October 2014)



Source: Central Bank of Trinidad and Tobago

The use of LTV's in Trinidad and Tobago is at a more microprudential level with each major mortgage lending institution adopting its own credit policy and internal limits for LTV, on a case by case basis and can be as high as 95 per cent (Figure 10). On average, the LTV on a loan for the purchase of land and building is 91 per cent and 84 per cent for the purchase of land. It is clearly seen that in most cases, institutions have adopted a conservative approach to mortgage lending, with reported average LTVs well below the values stipulated in their credit policies. Institutions have only begun to report on average LTVs via recently introduced regulatory forms, which will continue to be monitored. These forms merely capture an average LTV per institution categorized by residential and non-residential properties. Each category is subdivided into land and land and building. Possible augmentation of the regulatory reporting forms should be strongly considered in order to obtain a better scope of the data for analysis.

From a regulatory standpoint, there is no real use of LTV's as a macroprudential tool except for mention of it not exceeding 90 per cent of the value of the mortgage loan for connected parties of financial institutions in the Financial Institutions Act (2008).

Section 5

Conclusion and Recommendations

When it comes to the housing market of Trinidad and Tobago, should an LTV cap be considered as a macroprudential tool to be used within the local financial system?

It is prudent that institutions have some sort of limit with respect to leverage of instruments such as mortgages. There have been cases in the United Kingdom and the Netherlands where many households were able to borrow up to 125 per cent of the property valuation amount. This can spell disaster when the economy makes a downturn. In the United States, during the healthy years, there was the phenomenon of flawed valuations done behind the scenes, not to mention institutions were lending more than 100 per cent of the valuation amounts. However, caution should be placed against efforts to introduce 'new' tools to the system without understanding the ramifications of such. The question left in policymakers minds would be whether setting a cap on the LTV should be made by the regulatory authority or left up to the financial institutions who will define such terms within their respective credit policies. Further, should the cap be static or be varied periodically?

Overall, the motivation for the use of LTV policies is driven by consumer protection and at the same time it enhances financial stability. The LTV tool introduces a buffer by increasing the amount of collateral held against the mortgage and thereby reducing leverage. It also has the potential to reduce demand, containing the boom, as it acts as a binding constraint for borrowers. The following are some considerations regarding the use of the LTV as a macroprudential tool:

- *Stand-alone tool or a set of instruments:*
  In some regions, the LTV tool is used as a single instrument to address systemic risks generated from the housing market, followed some years later by other macroprudential housing related measures as in the case of Korea. This is a phased approach, as in the case of Norway and Israel, where initially higher risk weights were applied for higher LTV mortgages, followed by caps on LTV ratios in the second stage of implementation. In some cases, alongside the LTV tool, the use of the debt-to-income measure is used, as both complement each other, in reducing the cyclicality of the property market. In the case of New Zealand, a combination of policies is in effect to keep mortgage lending under control. This includes mortgage related tools such as LTV limits, a core funding

ratio (liquidity related measure), countercyclical capital buffer and sector-specific capital requirements (capital-related measures). Using a combination of macroprudential instruments gives a greater assurance of tackling risks from varying angles but it should be noted that it implies higher regulatory and administrative costs for enforcement.

- *Static or dynamic measure:*

  A rules-based approach to macroprudential measures may be less risky than a discretionary approach. However, in the case of the LTV ratio, the short historical experience indicates that it can be helpful to adjust them across the housing cycle at the policymaker's discretion. It is cautioned that such adjustments should not be done frequently or in an ad-hoc manner. Hong Kong has been successful in its dynamic use of the LTV ratio, with several rounds of adjustment since its introduction, based on their procyclical needs. New Zealand does not ban high LTV mortgages but they are limited, in that only 10 per cent of all new mortgages of each bank can have a LTV of more than 85 per cent be applied.

- *Transparency and accountability:*

  The LTV ratio is easily understandable to the public and therefore acts to maximize transparency and signaling effects. It can be used to flag a regulatory concern regarding the heat in the housing market and be used to avoid borrowers being pushed into negative equity. If a dynamic LTV is proposed, the reasoning for the adjustment during the cycle should be clearly articulated to the public to enhance transparency and effectiveness, and be based on sound principles. A leading regulatory authority should be given the responsibility for the implementation and administration of the LTV ratio. Therefore, the implementation of such a tool carries with it some reputational risk and as such a clear mandate, with a governance and accountability framework be implemented.

- *Issue of Effectiveness:*

  In many of the countries where the LTV tool was implemented, they typically have self-assessed the ratio as effective. As Section 3 highlighted, with the introduction of the LTV tool, in some countries credit growth declined and in the case of Hong Kong there was an immediate reduction in house price appreciation, even though this diminished subsequently. The use of this tool has only become very popular post financial crisis in many countries, therefore it may be too early to tell its true effectiveness to dampening credit growth.

- *Issue of Efficiency:*

  If LTV limits are introduced in isolation to other lending principles, they can have the potential to screen out borrowers who have little equity but may have the ability to repay the mortgage for its respective tenor. Conversely, it may allow in the system, borrowers who have the initial equity but would not be able to service the mortgage over its full term. Therefore, calibration of the instrument may be a challenge, since it is not the intention to limit growth unnecessarily or create distortions in the housing market. For example, groups impacted by the LTV limits may be those in need of credit (low to middle income and first time home buyers).

- *Gaming of the System:*

  Valuation of property of the LTV ratio is dependent on real estate appraisers. This can be a source of serious concern if there is a conflict of interest in the appraisers' activity. This may affect the credibility and the effective use of this macroprudential measure. Another way gaming may take place is that banks may decide to lend secured up to the LTV cap and then extend some form of unsecured security for the difference needed by the borrower. In the case of Sweden, the implementation of LTV limits has increased the portion of unsecured lending in the system. Regulators are not too alarmed though, since they have concluded that the portion of unsecured lending relating to the housing market is minimal.

- *Broad based or targeted:*

  Some countries apply the macroprudential instruments broadly without very little differentiation while other countries may establish specific tools for meeting specific objectives. In Hong Kong and Korea, targeted caps were applied on the LTV ratios based on loan size, location and the value of the property. In New Zealand, a broad countercyclical capital buffer was implemented, which affects all lending activity in the countryBased on the literature review, in most cases the cap on the LTV ratio is typically found through trial and error, with countries starting with a threshold and then adjusting up and down to obtain the suitable setting. In some countries with targeted limits, the differentiation is based on borrower type (owner-occupied, bought for investment, first-time home owner and refinancer) and property type (location and value). For Trinidad and Tobago, in cases where speculative buying leads to an unsustainable rise in the median house price, targeted limits on the LTV based on borrower type, for example, second home/investment properties could be researched and considered.

The financial crisis has emphasized the importance of financial stability and more so the use of macroprudential tools to curtail the growth in imbalances in the system and reduce the likelihood of a crisis. Any country planning to adopt these tools must do the following main steps:

1. Systemic Risk Assessment – to determine whether the debt levels are adequate, if the asset prices are overvalued in the system and the state of lending standards.
2. Macroprudential Intervention – to assess whether policy intervention is needed, examining the cost-benefit analysis of implementing and enforcing the instruments. In the case of caps on the LTV ratio, this will entail the collection of data on lending patterns by borrowers. Restrictions always imply greater enforcement and monitoring for compliance.
3. Selection of instrument – this must be a thought out thorough process to ensure that the appropriate tools are implemented to meet the policy objectives based on the risks facing the financial system.
4. Implementation – to make decisions on the following inter alia, whether the tool will be discretionary, target or broad based, the regulatory authority accountable for administration and whether it is to be done on a phased basis or as a single instrument or a suite of instruments.

In conclusion, macroprudential policy is a new and evolving field in the world of financial stability. It is expected that international experiences on the costs and benefits of the various instruments in the macroprudential toolkit will accumulate over time, as more and more countries adopt the use of such tools. As is stands, the overall trend in the median house prices of Trinidad and Tobago must be carefully monitored to ensure that any uptrend is sustainable and if 'a bubble bursts', financial instability is a minimal risk. Regulators have an increasing role to play in the adoption of macroprudential policies and determining which housing related tools would be most effective, more specifically the use of the LTV ratios in the first instance.

While the LTV is a targeted macroprudential instrument with the flexibility to be tightened or loosened based on economic fundamentals, it is recognized that the implementation of such ratios are also politically sensitive. Further, based on the snapshot of our housing market, while real estate residential exposures are on the rise, it was observed that the major lending institutions have been generally adhering to their respective credit policies for residential mortgages and are also stringent in the underwriting of new mortgages. Therefore, there may not be an immediate need to implement an LTV cap as a mandatory policy tool at this time. However, as the Central Bank is on the verge of rolling out the revised prudential regulatory framework which is geared towards adopting elements of the Basel II and III frameworks, the implementation of risk weights that appropriately reflect mortgage risk may be best in the first instance. It is proposed that the regulatory authority continue to track the LTV ratios of the lending institutions and implement

measures to track other housing related ratios i.e. debt to income, house price to rent and household debt to disposable income, so that in the future if a decision is made to implement the LTV as a macroprudential tool, it can serve to complement the capital requirements of the Basel II and III framework.

However, there were data shortcomings in this paper in analyzing Trinidad and Tobago's housing market to comparable variables of the more advanced economies. This presents an opportunity to greater enhance the data collection process and have more focused analysis on relevant housing data. It also allows for the introduction and implementation of new types of data from a regulatory standpoint to better aid in monitoring on both a microprudential and macroprudential level. We will continue to learn and assimilate from the growing experiences of countries adopting the use of LTV ratios in mitigating house price volatility thus enhancing our framework on financial stability and more specifically, macroprudential policy.

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APPENDIX 1: The use of LTV ratio as a macroprudential tool – Country Experiences

REPUBLIC OF KOREA

In the Republic of Korea, LTV limits were introduced in the latter part of 2002 as part of the government's objectives to stabilize house prices. Housing prices and income increased marginally in the period 2000-2007 by just 7 per cent compared to in excess of 30 per cent in OECD countries[7]. Even though the increases were concentrated in the capital, Seoul, Korea's government was mindful of these house price increases since it could have been easily spread to other parts of the country. In response to the price increases, there has been an increased presence of macroprudential supervision to avoid the implications and cyclicality associated with boom and busts cycles. The full complement of macroprudential tools (although the majority are outside of the ambit of this paper) were the adjustments on LTV and DTI ratios, moral suasion on lenders, subsidies to housing finances, changes in tax and government supply of new housing units/ purchase of existing units.

There were two major housing cycles in Korea. In the first cycle, real estate came to the fore as the preferred asset class resulting in banks aggressively extending credit to households, since monetary policy was eased to boost the economy. To temper this increase, a maximum LTV ratio of 60 per cent was introduced in 2002 and this resulted in a 20 per cent decrease in house price appreciation on a year-on-year basis to 9 per cent in just 6 months. However, success of this round of LTV tightening was short-lived since house prices accelerated again. In response, the Korean government, tightened LTV limits twice to 50 per cent then to 40 per cent. This was coupled with the implementation of tax measures, which increased the taxes for owners of multiple properties.

The second cycle was preceded by the accommodative monetary policy that was employed to combat the financial distress due to the credit card fiasco and increased competition among lenders. As a result of increased taxes discouraging potential sellers, a shortage of homes for sale followed. In addition, the recent crisis caused prices to decline sharply up until the second half of 2009 when house prices began to recover. To mitigate any disastrous consequences, LTV limits were tightened until the 3rd quarter of 2010 and resulted in excessive cooling which caused the

[7] Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, United States

Korean government to loosen measures in August 2010. All adjustments in Korea's LTV ratio for the period 2002 to 2009 are summarized in Table hereunder.

Table: History of Korea's Adjustments to its LTV ratio

Date	Specification
September 2002	Introduction of the LTV Ratio cap of 60 per cent but a differentiated cap depending upon the maturity of the loan, housing price and location.
June 2003	The LTV ratio was lowered from 60 per cent to 50 per cent for loans with a maturity of 3 years or less and backed by real properties located in speculated areas
October 2003	LTV Ratio further reduced from 50 per cent to 40 per cent for loans with maturity of 10 years or less and backed by apartment units in speculative areas
March 2004	The LTV Ratio was raised from 60 per cent to 70 per cent for mortgage loans not generally used for speculative purposes: those with a maturity of 10 years or more and less than one year of interest only payments
June 2005	LTV Ratio for apartment units priced just about US$600,000 in speculative areas was lowered from 60 to 40 per cent
September 2006	LTV ratio for all mortgage borrower seeking an apartment unit priced more than USD$600,000 was set at 40 per cent
July 2009	LTV Ratio was lowered from 60 to 50 per cent for: (i) Apartment units with mortgage maturities of less than 10 years. (ii) Apartment units with mortgage maturities of more than 10 years but with a collateral value over USD$600,000. (iii) Non-apartment, detached units with mortgage maturities of less than 3 years. In the Seoul Metropolitan area
October 2009	LTV Regulations were expanded to all financial institutions for the metropolitan area

Source: Soon-taek Chang, 2010, Mortgage Lending in Korea: An Example of a Countercyclical Macroprudential Approach

Fast forward to 2014, the LTV ratio has been set at 70 per cent (on all transactions), up from a range of 50 per cent-85 per cent in 2013, which applied to banks and non-banks and differed between metropolitan and other areas.

In the case of Korea, it can therefore be discerned that LTV ratios was successfully used as a targeted policy tool. The literature revealed that transaction activity dropped significantly in the three-month period following the tightening of the LTV ratio regulations. Price appreciation slowed within a six month window (Igan & Kang, 2011).

HONG KONG SAR

Hong Kong has made use of the LTV ratio for almost 20 years. The use of LTV ratios in Hong Kong shows how the ratio can be manipulated to meet a country's banking stability objective. They applied tighter caps on luxury properties, investment properties and borrowers with sources of income from abroad. The use of the LTV ratios in Hong Kong was necessary due to the unique policy environment of Hong Kong's financial system which can be characterized as follows:

- Residential mortgages have always been one of the largest areas of risk exposure in Hong Kong and accounts for at least 20 per cent of the banking sectors lending, peaking at 37 per cent in 2002.
- The strong cyclical patterns in property prices have the ability to destabilize the banking system, given the banks' exposure.
- The Hong Kong Monetary Authority (HKMA) must possess alternative polices for managing systemic risk from banks' exposure to the property market. This is because it is not allowed to conduct independent monetary policy.

Hong Kong's experiences with the use of the LTV's can be segregated into four (4) distinct phases.

- **Phase 1 (before 1997):** Before 1991, banks were allowed to grant mortgages up to 90 per cent of the purchases or market value price, whichever was lower. This was merely a guide. In 1995 however, the Hong Kong Government implemented that a 70 per cent LTV ratio be adopted as a long-term regulatory policy.
- **Phase 2 (1997-1999):** In 1996, Hong Kong experienced a sharp rise in housing prices that were deemed to be signs of speculative activities, especially at the upper end of the housing market. There were increases of 30 per cent and 21 per cent in house prices and mortgage lending respectively. The HKMA instructed that all financial institutions adopt a maximum LTV ratio of 60 per cent for properties with a value of more than HK$12 million[8]on luxury properties.
- **Phase 3 (2000-2008):** In 2001, the HKMA no longer implemented the former LTV ratio of 60 per cent for luxury properties and reverted to a 70 per cent maximum LTV ratio. This decision was precipitated by the Asian Financial crisis, which led to the fall in household income. Also, the HKMA instituted a Mortgage Insurance Programme (MIP), where loans were granted with an LTV of 90 per cent to homebuyers meeting the required eligibility criteria (e.g. maximum levels for DTI ratio, loan amounts and maturities). These assisted households to overcome liquidity constraints, while limiting the credit risk to the banks by the now stringent underwriting criteria which ultimately redounded to the improved stability of the Hong Kong's banking system.
- **Phase 4:** The final stage of Hong Kong's experience with the LTV policy covers the period 2009 to 2014 and this coincides with the occurrence of the global financial crisis and its aftermath. In 2009, real house prices increased by about 90 per cent from 2008 especially in the high-end housing market. The LTV ratio was reduced from 70 to 60 per

[8] 1 HK$=US$0.13 as of October 2014

cent for properties valued HK$20 million or more in an attempt to tame the market. August 2010, saw the introduction of the LTV ratio of 60 per cent to property valued at least HK$12 million or properties that are not owner-occupied. Further evolution took place, and in November 2010, the LTV ratio was reduced to 50 per cent for properties with the same value. For residential properties in the range of HK$8 – HK$12 million, the LTV was lowered from 70 per cent to 60 per cent, while capping the maximum loan amount at HK$6 million. Maximum LTV of 70 per cent remained for properties valued at HK$8 million or less, but the maximum loan amount was capped at HK$4.8 million. The maximum LTV ratio for all non-owner occupied residential properties, company-owned properties and industrial and commercial properties was lowered to 50 per cent, regardless of their market value. These changes eventually led to the leveling off of prices toward the end of 2013.

For Hong Kong, the changes in the LTV ratio saw a reduction in transaction volumes and slowed house price inflation (Ahuja and Nabar 2011). LTV limits also dampened borrowers' leverage and credit growth and lowered the impact of a property price correction in mortgage default risk (HKMA 2011; Wong, Tsang, and Kong, 2014). In essence, LTV policy in Hong Kong has proven to be effective in reducing systemic risk in the property markets. There was a concern that with the introduction of the MIP, households may increase their leverage ratios, increasing the risk of mortgage defaults and credit losses. However, the MIP was beneficial in mitigating liquidity constraints without undermining the effectiveness of the LTV ratio.

An interesting fact is that despite the steep drop in house prices of 66 per cent, after the Asian crisis, the country experienced a low mortgage delinquency rate of 1.4 per cent. This is in sharp contrast to the United States where house prices decreased by one-third between 2006 and 2011 and the mortgage delinquency ratio rose to over 10 per cent. Therefore, an important factor for the resilience of Hong Kong's mortgage market was the use of the macroprudential tool to cap the LTV ratio for mortgages.

The case of Hong Kong therefore informs us that policy makers, who are unable to conduct autonomous monetary policy, can employ the LTV ratio as an alternative to guard against housing market bubbles. Also, the costs of using LTV ratios can be limited by complementing its use with back-up social policies, such as Hong Kong's MIP. One important feature of the LTV policy was that the regulators adjusted the maximum LTV ratio instead of the actual market LTV ratio.

SINGAPORE

In Singapore, one of the two regional financial centers in Asia, the use of macroprudential policies has been centered around the housing market and its use has been increased significantly especially after 2009. In Singapore, there was coordinated use of different policy tools for an effective and coherent response to housing market pressures. It addresses the different market segments and this helps to influence market expectations and requires a high level of collaboration among the different agencies involved. The implication of this is that Singapore has taken a targeted approach, differentiating the cause of housing demand and consideration of supply factors.

From 2009, there was a "sharp rebound in real house prices and mortgage loans" (Regional Economic Outlook, Asia and Pacific). In Singapore, the inelastic supply of housing, strong economic growth, persistently low interest rates and an increase in foreign investors after the recent financial crisis were responsible for the increase in real estate prices. LTV limits were tightened (lowered) but this targeted second mortgages and mortgages with high tenors. The evidence indicates that the LTV ratio has been responsible for cooling down, what once was a highly exuberant real estate market. The results were that the share of borrowers with single mortgages increased and speculative transactions decreased. Singapore also loosened its LTV during the Asian Crisis as macroeconomic conditions deteriorated.

SWEDEN

In October 2010, Sweden introduced the use of LTV ratio limits. The main purpose for this decision, as indicated by the Swedish Financial Supervisory Authority, was to address consumer risks arising from the vulnerability of highly leveraged households to the adverse development in the housing market.

In Sweden, household related loans account for 85 per cent of lending to households (Swedish Mortgage Market 2013). The Swedish Council for Cooperation on Macroprudential Policy is responsible for monitoring and preventing the buildup of systemic risks. Based on the recent growth in mortgages in 2013, the Council has started its implementation of specific tools.

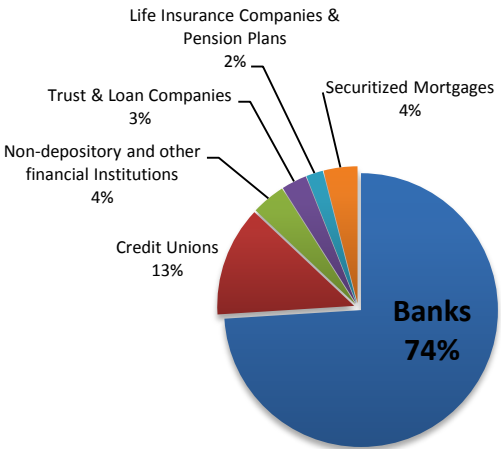
From the mid-1990s, the ratio of household debt to personal disposable income steadily climbed, reaching a record 163 per cent in 2010. Mortgage debt as a share of household income rose from 73 per cent in 1996 to 145 per cent in 2010. By 2010, 35 per cent of total outstanding bank loans in Sweden were to the household sector, up from just 18 per cent in 1995. During 2000-2010, residential mortgage lending increased by more than 15 per cent. During this period, the LTV ratio gradually increased from 60 per cent to 70 per cent.

The global financial crisis saw a decline in house prices in 2008 momentarily, after which they rebounded strongly. In an attempt to protect consumers, the Swedish Supervisory Authority introduced an LTV cap of 85 per cent in October 2010. This intervention was able to stop the trend of rising LTV ratios and level-off house price inflation. However, this was a temporary effect because credit growth and household indebtedness continued to increase after 2011 and the authorities in Sweden would have to do further adjustments before any sustained benefits are experienced.

CANADA

In the 2000s, Canada experienced rapid growth in house prices, residential mortgage credit and consumer credit. House prices doubled and ratios of house prices to income and house prices to rent increased sharply (IMF, 2014a). Between 2000 and 2008, mortgage credit expanded on average by almost 9 per cent per year. The ratio of household debt to disposable income rose to 165 per cent in 2013. In Canada, the main source of financing for housing originates from the bank (See Figure below). Residential mortgages represent 30 per cent of banking system assets. Of total household credit, residential mortgage credit was approximately 70 per cent and is on the rise.

Figure: Composition of Mortgage Financing in Canada (as at March 2013)



Source: Krznar and Morsink 2014

However, it is believed that the Canadian mortgage market is simple and conservative, particularly when compared to the United States. Mortgage insurance backed by the government is provided by the Canadian Mortgage and Housing Corporation (CMHC), with a market share of about 75 per cent of mortgages. Financial institutions are mandated by law to insure residential mortgage loans when the LTV ratio is in excess of 80 per cent (less than 20 per cent down payment). Mortgages with LTV ratios less than 80 per cent, may be insured, but this is optional.

In Canada, the combination of the requirement that most lenders have insurance for high LTV mortgage loans and the central role of the government in providing such insurance gives the government great power to influence housing finance and about three fifths of mortgage lending is covered by mortgage insurance (Krznar and Morsink, 2014). The insurance component therefore protects financial institutions against possible defaults on high ratio loans. After the global financial crisis, steps were taken to tighten mortgage rules, a reversal of the loose conditions that existed in the mid-2000s. The key measures were as follows:

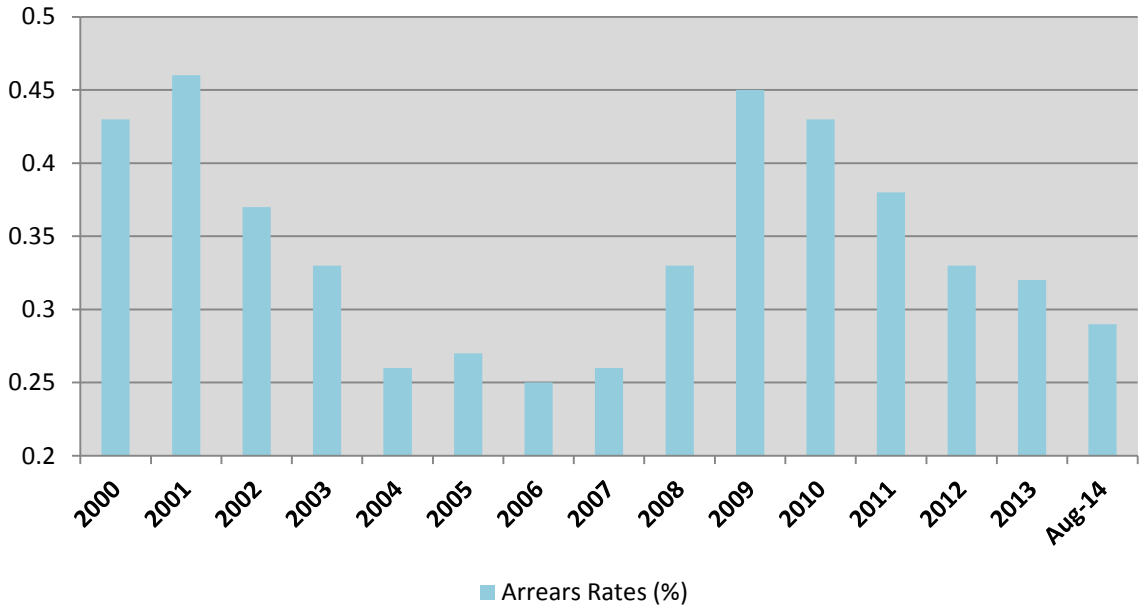
- The maximum LTV ratio on refinancing loans was lowered from 95 per cent to 80 per cent;
- The maximum LTV ratio for government backed mortgage insurance on non-owner occupied properties (bought for speculative purposes) was tightened to 80 per cent;
- The maximum amortization schedule for new government backed insured mortgages with LTV ratios greater than 80 per cent was reduced from 35 to 25 years.

To assist in reining in the housing market, microprudential measures were also introduced and included a guideline issued by the Office of the Superintendent of Financial Institutions (OSFI) for residential mortgage underwriting practices in 2012.

Overall, Canada's measures have been effective in curbing mortgage credit growth and slowing the upward trend in house prices. An assessment was done on the likely effectiveness of their macroprudential measures where evidence suggests that the growth in mortgage credit and house prices dampened. Empirical evidence indicates that a 1 percentage point reduction in the maximum LTV ratio lowers annual mortgage credit growth by about ¼ to ½ percentage point (Krznar and Morsink, 2014). The success of Canada's attempts is exemplified by its mortgage arrears rate[9], which is very low and stable since the beginning of the global financial crisis (see Figure below).

[9] The ratio of all loans that are more than 90 days due to the number of outstanding insured loans.

Figure: Per cent of Arrears to total number of Mortgages (residential) in Canada



Source: Canadian Bankers Association

The Canadian experience is therefore indicative of what can be achieved when a country has clearly outlined objectives and a set of long-term macroprudential tools which can be manipulated.

NEW ZEALAND

The Bank of New Zealand together with the Ministry of Finance has signed a Memorandum of Understanding (MoU) to set macroprudential policy objectives. Despite the MoU, the Governor of the Reserve Bank is responsible for the final policy decision and a minimum of two weeks' notice is required before any adjustments on the LTV are made.

With reference to the housing market, they have implemented quantitative restrictions on the share of high LTV ratio loans to the residential property sector. The LTV restrictions are applicable to all registered banks in New Zealand. The implementation of the LTV ratios limits was necessary because 56 per cent or NZ$178.6 billion of bank lending is in residential mortgages according to Reserve Bank sector credit data. As of September 30 2013, household debt to disposable income ratio was at 142.8 per cent, down from its 2009 high of 153.4 per cent.

The Reserve Bank of New Zealand has implemented restrictions on high LTV ratios effective October 01, 2013. The instituted "speed limits" restrict the share of new high LTV lending that banks may undertake e.g. only 10 per cent of new lending permitted with an LTV above 85 per cent, 55 per cent with an LTV above 90 per cent. This would allow banks to provide some high

LTV mortgages to creditworthy borrowers and reduce the incentives for disintermediation. Another option employed is "outright limits" on the proportion of the value of the residential property that can be borrowed e.g. zero new residential property lending permitted with an LTV ratio above 90 per cent.

To ensure that the social costs/ implications are not exorbitant, exceptions include: loans under the New Zealand's Welcome Home Loans Scheme, Bridging Loans, refinancing of existing LTV residential mortgage lending and the transfer of an existing high LTV residential mortgage loan to another residential property (Rubio et al, 2014). The possible benefits are inter alia increased financial system resilience and reduced credit growth which will be advantageous to the country.

Further, the regulatory framework of New Zealand was augmented to require banks to hold more capital on high LTV lending, founded on the Basel II framework, thereby aligning capital requirements with the risk associated with banks' exposures. Given that New Zealand is at the infancy stage in the implementation of LTVs, it is too early to determine the level of success with this initiative.

ENGLAND

Just like New Zealand, England is new to the use of the LTV ratio limits as a macroprudential tool. The regulatory framework changed drastically on April 01, 2013 where a new twin-peaks structure comprising of the Prudential Regulation Authority (PRA) and the Financial Conduct Authority (FCA) replaced the Financial Services Authority (FSA). In addition, the Financial Services Act 2012 established "an independent Financial Policy Committee (FPC), a new prudential regulator as a subsidiary of the Bank, and created new responsibilities for the supervision of financial market infrastructure" (Bank of England Website, November 3, 2014). The Financial Policy Committee (FPC) is responsible for oversight of systemic risk in the country to enhance the economy's resilience. In its role, the FPC assists the PRA and FCA with residential mortgage lending, both owner-occupied and buy-to-let.

By November 2013, the number of high LTV mortgages approved in England had doubled year-on-year, due to loans being made available to borrowers with small deposits. High LTV loans accounted for over an eighth of all home purchase approvals in that month. For the same period, house prices increased by 4.9 per cent year-on-year. Given this development, mortgages were identified as the single largest asset class on banks' balance sheets and the largest liability to UK's households (FPC Statement September 2014). To mitigate any buildup of risks, the FPC recommended to the PRA and FCA to impose a limit on the proportion of UK residential

mortgage lending above a given threshold (15 per cent limit on mortgage loans where the loan to income is at or greater than 4.5). This however is a recommendation which cannot be enforced.

In an attempt for the Bank of England to have the legal authority to act on the FPC's directive, the next step will be acquiring legal powers to influence the pro-cyclicality in the mortgage market and by extension avoid another housing bubble. Under the new powers, the Bank will be able to force potential homeowners to find bigger deposits and impose new limits on the amount people can borrow to buy a home, to guard against potential risks in the housing market, which Governor Mark Carney has described as the biggest risk to UK financial stability. The legislative changes are expected to be enshrined in law by 2015 following a Treasury consultation ("Bank of England calls for legal power to cap loan-to-value ratio on mortgages"- The Telegraph October 2, 2014).

On October 1, 2014, the Bank of England put the FPC's recommendation into effect. However, to avoid excessive burdens on financial institutions, the PRA considers that it is appropriate to extend the de minimis threshold to apply on either a value or volume of lending basis. This means that lenders who extend less than £100 million in value or fewer than 300 in number of relevant regulated mortgage contracts(6) each year fall outside the scope of the policy. England will be able to also boast of strides in this area and the ultimate benefit of 'cooling' excessive credit growth, household debt and slowing increases in property prices, once the policy has had some time to work.

The few country cases examined illustrated the flexibility of the LTV ratio. This is a positive feature since it can be repeatedly tightened and loosened based on economic fundamentals and the specific country objectives. Also, the use of the LTV ratios allows all relevant authorities to work together to prevent house price collusion and reap the best results for all parties which redounds to the benefit of the economy through increased financial stability.

As easy as it seems for countries to adjust its LTV ratios, bear in mind that calibration of this macroprudential tool maybe be very complicated given the inexperience of most jurisdictions with this type of tool. They will also have to be aware of how the adjustment of this tool will affect other policy decisions which it will take.

Overall, the LTV ratio can curb expectations and discourage potential speculators, thereby being an effective tool to tame real estate booms and contain the associated risks (Igan and Kang 2011).

APPENDIX 2: Trinidad and Tobago- Effects of specific variables on house prices

$\log (HP) = c + \beta_1 \log(REM) + \beta_2 \log(TTCI) + \beta_3 \log(OP) + u_t$

Dependent Variable: LHP				
Method: Least Squares				
Date: 11/06/14 Time: 11:05				
Sample: 2003M02 2014M09				
Included observations: 140				
White heteroskedasticity-consistent standard errors & covariance				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.109254	**0.088362**	35.18751	**0.0000**
LREM	0.202648	**0.007913**	25.60996	**0.0000**
LTTCI	-0.039582	**0.011236**	-3.522705	**0.0006**
LOP	0.025947	**0.010881**	2.384537	**0.0185**
R-squared	0.957911	Mean dependent var		4.769124
Adjusted R-squared	**0.956983**	S.D. dependent var		0.094924
S.E. of regression	0.019688	Akaike info criterion		-4.989482
Sum squared resid	0.052715	Schwarz criterion		-4.905435
Log likelihood	353.2638	Hannan-Quinn criter.		-4.955328
F-statistic	1031.752	Durbin-Watson stat		0.118704
Prob(F-statistic)	0.000000			