

Investigating the Interactions Between Capital Buffer, Credit and Output Growth: Evidence from The Jamaican Banking Sector

Kemar Whyte

Financial Stability Department

Bank of Jamaica

July 2013

Outline

† Introduction (Background, Motivation and Contribution)

† Literature Review

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Introduction

- The global financial crisis of 2007/2008 have reinforced the importance of adequately monitoring financial systems since such crises may have lag effects on the rest of the economy via the financial sector.
- The performance of the economy has implications for the earning potential of financial institutions and vice versa
- The typical credit channel via monetary policy becomes inefficient, especially in crisis periods. As such, macroprudential policy tools would provide that 'second instrument' to propel the economy.
- The paper contributes to the post-crisis literature on the procyclicality of the financial system by providing bank-level evidence from Jamaica.

Literature Review

The Procyclicality & Countercyclicality Hypothesis

Procyclicality

- Procyclicality of the financial system can be defined as the amplification of swings in the economic cycle by financial sector activities
- Serious implication during economic downturn

Supporting Literature:

- Coffinet *et al* (2011) assessed the extent to which capital buffers intensify rather than reduce the cyclical behaviour of credit for French banks over the period 1993-2009. They found that capital buffers exacerbate the cyclical credit fluctuations arising from the output gap developments.
- Tabak *et al* (2011) used data for the period 2000-2010 to analyze the relationship between the economic cycle and capital buffers held by banks in Brazil. The results revealed that the economic cycle negatively affects surplus capital and that buffers have a negative impact on loans.

Literature Review

The Procyclicality & Countercyclicality Hypothesis

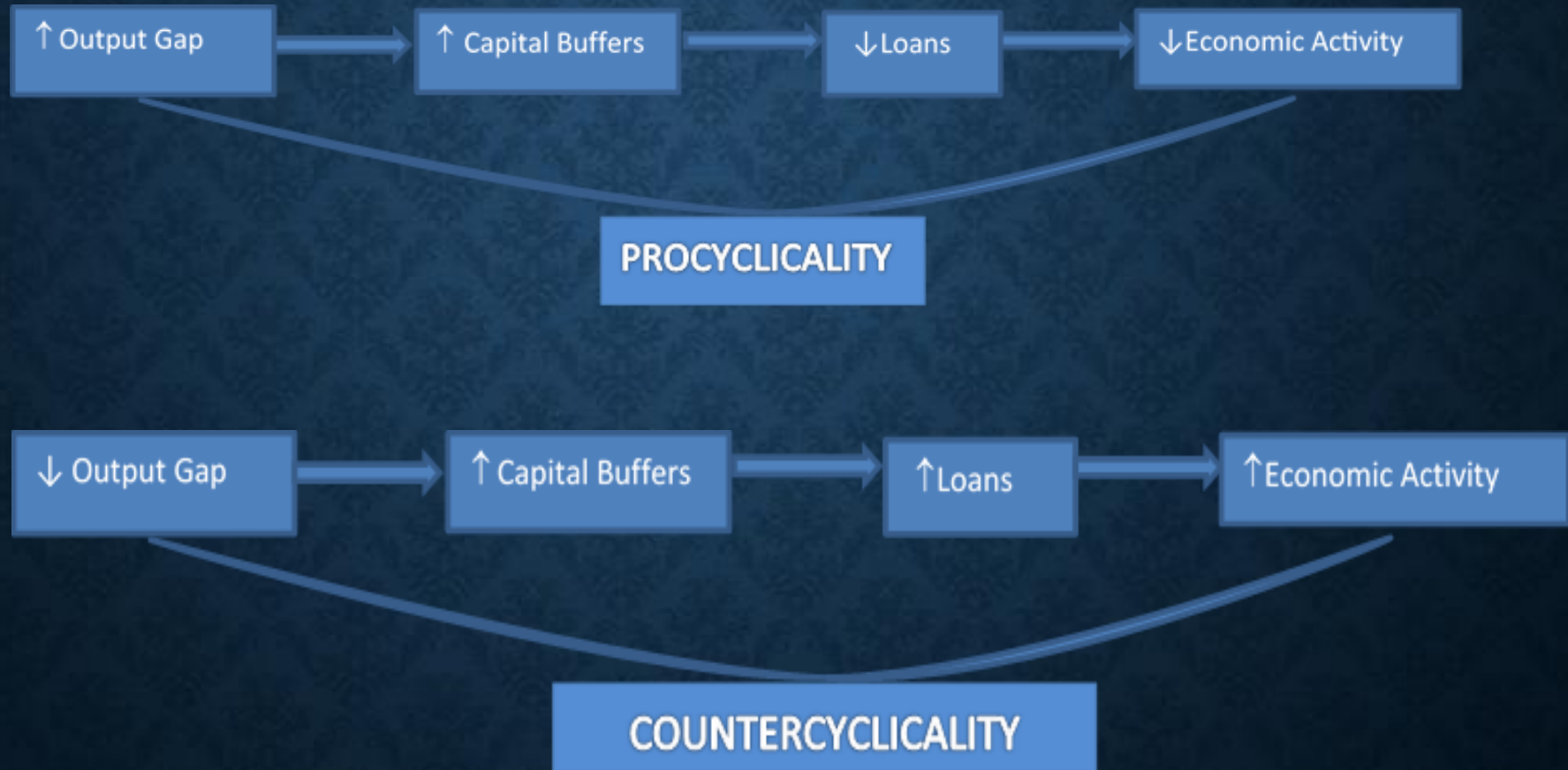
Countercyclicality

- Countercyclicality refers to the reduction or dampening of business cycle fluctuations through financial sector activities

Supporting Literature:

- Jokipii and Milne (2006) assessed the relationship between capital buffers and the output gap over a cross section of countries over a seven year period (1997-2004). They found that for smaller banks, capital buffer behaves countercyclical.

The Procyclicality & Countercyclicality Hypothesis



Data Employed

† Sample period: January 2000 – December 2012

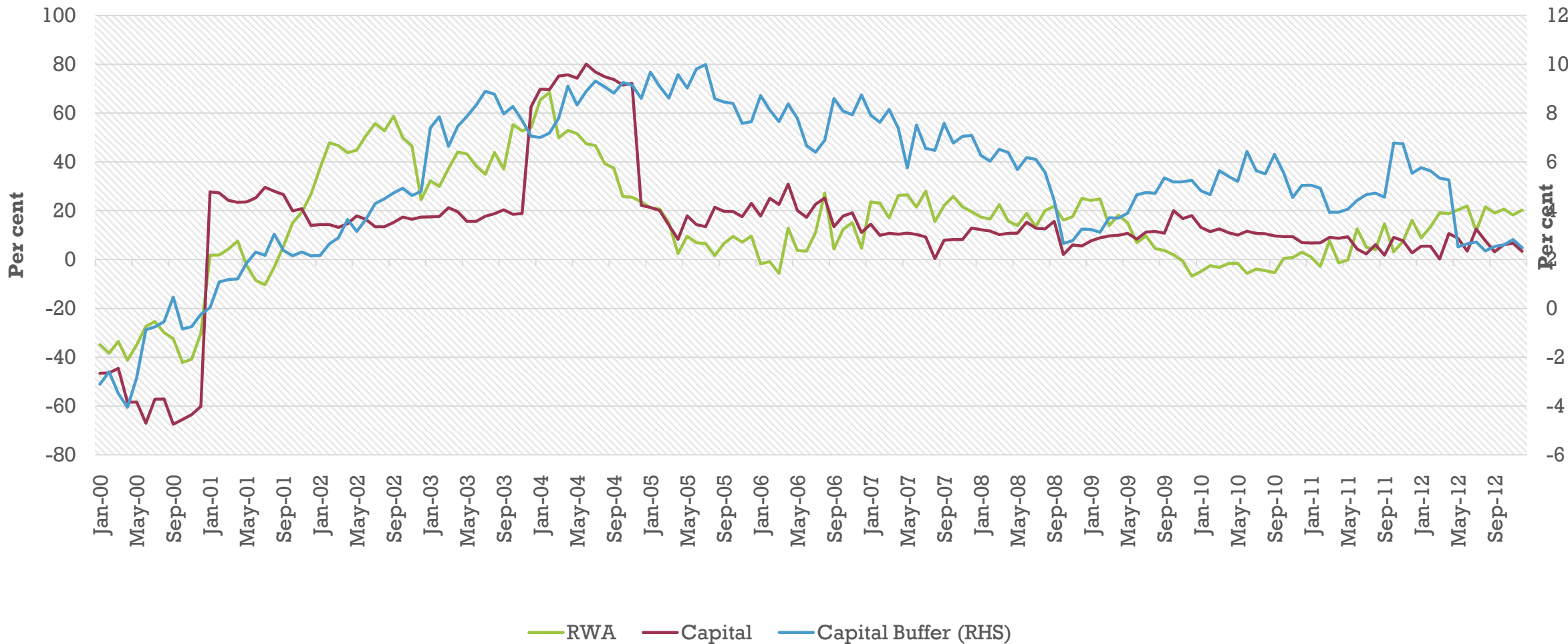
† Monthly Data

† Unbalanced panel

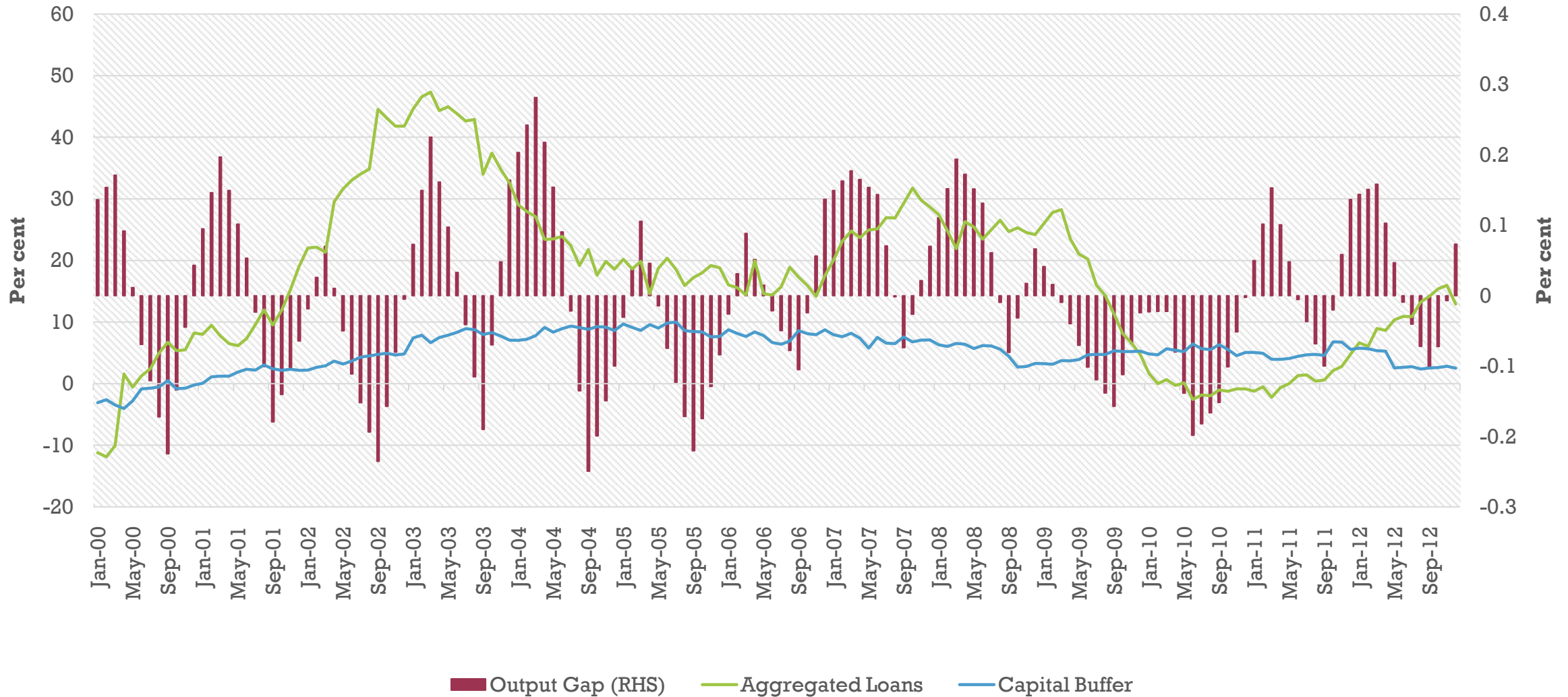
Specification of Variables

Variables	Measure	Notation
Buffer Equation		
Dependent Variable:		
Capital buffer	Measured as a ratio to regulatory capital	CB
Explanatory Variables:		
Return on equity	proxy for cost of capital	ROE
Bank size	Measured by the total assets of each individual bank minus the average total assets of all banks (both in logarithmic form)	Size
Capital buffer(lagged)	To account for the possible autoregressive behaviour of capital buffer	CB
Ratio of provisions	proxy for internal measure of risk	Prov
Output gap	Macro variable	Gap
Loan Growth Equation		
Dependent Variable:		
Loan Growth		Loan
Explanatory Variables:		
Loan growth(lagged)	Meant to assess the autocorrelation of credit growth	Loan
Ratio of Liquidity	Measured by the ratio of liquid assets to total assets	Liq
Bank size	As before	Size
Capital buffer(lagged)	meant to test for procyclicality	CB
Refinancing Rate	30 day repo rate	RR
Output gap	Macro variable	Gap

Time Plot of the (unweighted) Mean of Bank Variables



Cyclical Developments in Capital Buffers and Loan Growth



Empirical Model

Capital Buffer equation:

$$CB_{it} = \varphi_0 + \sum_{m=1}^M \varphi_m X_{m,i,t} + \varepsilon_{i,t}$$

- Capital buffer (CB_{it}) is the difference between economic capital and regulatory capital as a ratio to regulatory capital
- φ_0 is the intercept
- φ_m $m=1 \dots M$, denote the M coefficients common to all banks on the independent variables, $X_{m,i,t}$ (ROE, Size, prov, CB, Gap)
- $\varepsilon_{i,t}$ represents the residuals of the model, assumed to be i.i.d

Empirical Model Cont'd

Loan growth equation:

$$Loan_{it} = \delta_0 + \sum_{m=1}^M \delta_m X_{m,it} + u_{it}$$

- δ_m are parameters to estimate
- $X_{m,it}$ are the explanatory variables (Liq, CB, size, etc)
- δ_0 being an intercept and u_{it} is the residuals

Results

Buffer equation

Explanatory Variables	Expected Sign	(1) Total Buffer	(2) Tier1 Buffer	(3) Total Buffer(2)
ΔROE_{it-1}	(-)	-10.318** (4.528)	0.010*** (0.001)	-13.621** 5.718
$\Delta Size_{it-1}$	(-)	-7.313*** (1.056)	-0.011*** (0.001)	-8.897*** 0.838
ΔGAP_{t-1}	(?)	-18.235*** (1.743)	-0.046*** (0.007)	2.708*** 0.959
$\Delta Prov_{it-1}$	(+)	57.397*** (18.628)	0.020*** (0.004)	25.604 28.071
CB_{it-1}	(+)	-1.132*** (0.005)		-1.138*** 0.020
CB_{it-12}	(+)			0.948*** 0.043
$Tier_1_{it-1}$	(+)		-1.199*** (0.001)	
Observations		2016	2016	1942
Number of Banks		15	15	15
Number of Estimated Coefficients		5	5	6
Sargan test (p-value)		0.23	0.45	0.25

Note: *** significant at the 1% threshold, **5%; * 10%; Standard errors are in parentheses

Results

Loan growth equation

Explanatory Variables	Exp. Sign	Total Buffer GMM, System	Tier 1 Buffer GMM, System
<i>Loans_{it-1}</i>	(?)	-0.138*** (0.005)	-0.069*** (0.003)
<i>Size_{it}</i>	(+)	5.068*** (0.561)	-3.615*** (0.527)
ΔRR_t	(-)	-15.652*** (0.181)	-18.002*** (0.167)
<i>GAP_t</i>	(+)	21.252*** (0.402)	11.485*** (0.130)
<i>Liq_{it}</i>	(+)	14.156*** (0.609)	7.624*** (0.825)
<i>CB_{it}</i>	(?)	-0.034*** (0.007)	
<i>Tier_1_{it}</i>	(?)		-7.787*** (0.206)
Observations		2026	2026
Number of Banks		15	15
Number of Estimated Coefficients		6	6
Sargan test (p-value)		0.11	0.11

Note: *** significant at the 1% threshold, **5%; * 10%; Standard errors are in parenthesis

Main Findings

- A worsening of the real economy implies build up in capital buffers.
- Banks do not immediately build up buffer capital in the short-term.
- Larger banks hold less buffer capital.
- The output gap is negatively related to higher quality buffer capital.
- When buffer capital increases, banks supply less loans - PROCYCLICALITY

Vector Autoregressive (VAR) & Granger Causality Analysis

- Test for causality between banks' capital buffers and the loan growth using a panel granger causality test
- The VAR will provide:
 - Impulse response analysis
 - Variance decomposition

Results

Granger Causality

Granger Causality Tests on total capital buffer and loan growth

Null Hypothesis	F-Stat	Null Hypothesis	F-Stat
Capital Buffer does not Granger Cause Loan growth	12.830*** (0.000)	Tier 1 capital buffer does not Granger Cause Loan growth	5.139*** (0.000)
Loan growth does not Granger cause capital Buffer	0.356 (0.943)	Loan growth does not Granger Cause Tier capital buffer	1.048 (0.400)

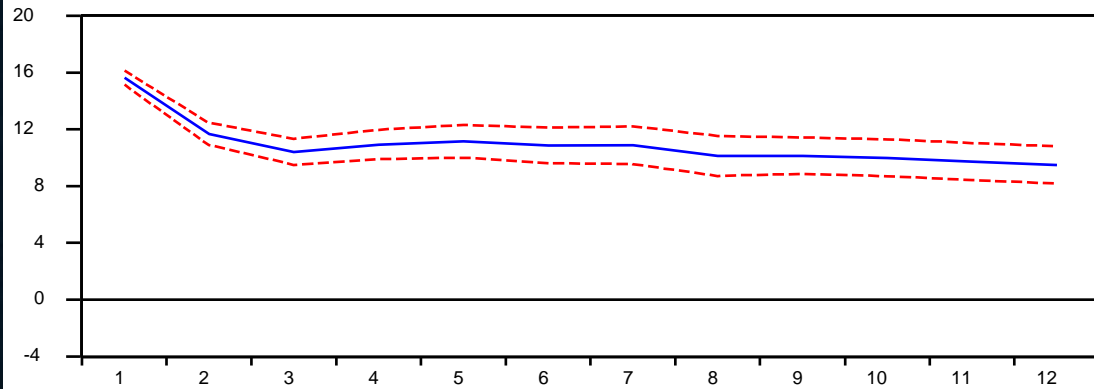
Note: p-values are in parentheses.

Impulse Response Functions

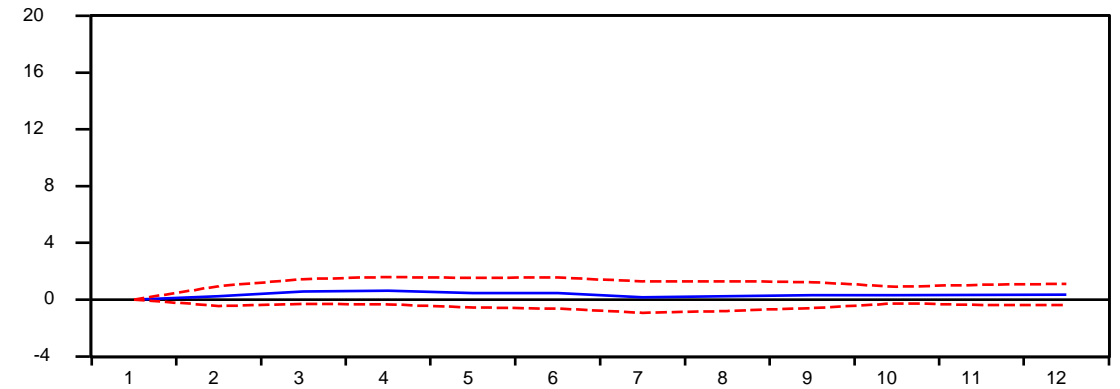
Impulse Response Functions

Response to Cholesky One S.D. Innovations ± 2 S.E.

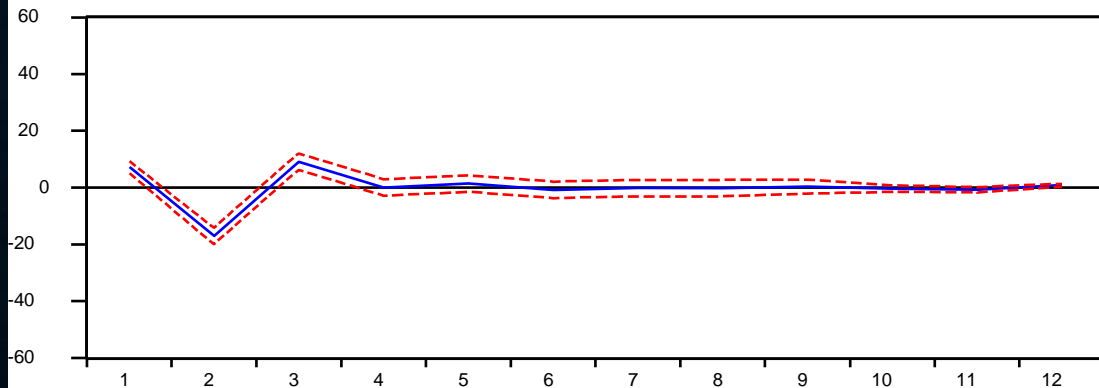
Response of CB to CB



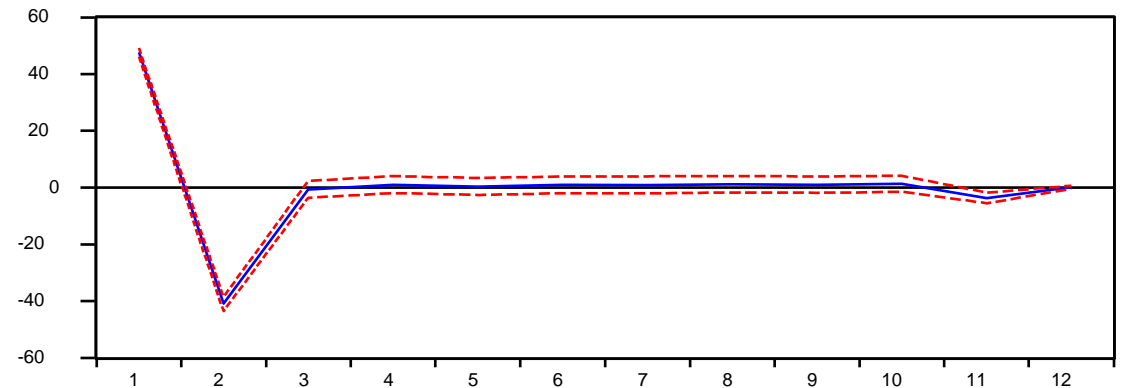
Response of CB to D LOAN



Response of D LOAN to CB



Response of D LOAN to D LOAN



Variance Decomposition

Variance Decomposition						
Period	Variance Decomposition of CB:			Variance Decomposition of Δ LOAN:		
	S.E.	CB	Δ LOAN	S.E.	CB	Δ LOAN
1	15.65495	100.0000	0.000000	48.24465	2.242331	97.75767
2	19.53245	99.98414	0.015863	65.53074	7.970729	92.02927
3	22.13680	99.92222	0.077780	66.16179	9.705834	90.29417
4	24.69180	99.87369	0.126307	66.16917	9.703671	90.29633
5	27.09835	99.86528	0.134715	66.18456	9.743010	90.25699
6	29.19747	99.85939	0.140610	66.19632	9.755261	90.24474
7	31.15806	99.87371	0.126290	66.20252	9.754015	90.24599
8	32.76054	99.88002	0.119978	66.21256	9.752061	90.24794
9	34.29141	99.88245	0.117554	66.22070	9.752227	90.24777
10	35.71721	99.88417	0.115826	66.23510	9.751528	90.24847
11	37.01807	99.88426	0.115742	66.34519	9.733680	90.26632
12	38.21621	99.88304	0.116960	66.35065	9.748219	90.25178

Summary & Policy Implications

- During economic downturn, DTIs in Jamaica raise the amount of capital buffers which limits their lending capacity.
- Capitalization is negatively related to the loans level.

Policy Implications:

- Pursue countercyclical buffer macroprudential policy – build up buffer during good times and release during bad times
- Regulators should maintain close monitoring and surveillance of the financial system during periods of economic downturn
- Employ enhanced stress testing practices to inform the build up of capital buffers above the regulatory minimum during periods of economic expansion

Summary & Policy Implications (Cont'd)

- Dynamic provisioning - allows for an earlier detection and coverage of credit losses in banks' loan portfolios, thereby allowing the build-up of a buffer in lending booms to be used in recessions.
 - Under this technique, banks make provisions based on the losses expected when loans are originated . This would result in a rising stock of provisions when actual losses are low, which would help to protect banks in periods when actual losses are high.
 - provisions should be set in line with estimates of long-run, or through-the-cycle expected losses.