



Working Paper

DRAFT

Determinants of Bank Performance in Jamaica

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Abstract

The recent global financial crisis has underscored the importance of sound bank liquidity management. This paper analyzes the performance of Jamaica's banking system by looking at the impact of the banks' liquid assets holdings on profitability with a bid to improve financial system soundness. To measure performance of the deposit taking institutions (DTIs), the paper used return on assets (ROA) as a proxy for profitability performance. Two econometric approaches were conducted to make inferences, an Ordinary Least Square (OLS) for each bank sub-sector and a 2-step General Method of Moments (GMM) Dynamic Panel for the banking system. The results suggest that there is an inverse relationship between profitability and liquid assets holdings for the sub-sectors. In addition, the result for commercial banks was more robust when an interactive dummy was utilized in the panel. The panel consisted of quarterly data from 2000Q1-2012Q1 for six commercial banks, four building societies and two FIA licensees. Macroeconomic variables were also included to test the profitability performance of banks when the economy deteriorated. It was found that when the country's debt level continued on its deterministic trend, the impact on profitability was negative. In addition, the relationship between non-performing loans and profitability suggests an indirect link to unemployment.

Key words: Bank Profitability, Financial Institutions, Financial Stability, GMM, Macroeconomic-specific factors, OLS, Panel Data

JEL classification: G1, G23, G32, G33

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1.0 Introduction

The current emphasis on the adequacy of liquidity for financial intermediaries emanated from the recent world financial crisis in 2008 and the ongoing crisis in the euro area. It has been established that illiquidity was one of the main factors that led to the 2008 financial crisis, and regulators across the world have been putting in place international standards and measures to enable banks to hold more liquid assets than in the past (BCBS, 2010). The effect of the 2008 financial crisis on Jamaican banks was not as significant as in other jurisdictions. Albeit the Central Bank did provide some financial assistance for institutions that received margin calls as well as provide domestic and foreign currency liquidity support for a temporarily dysfunctional interbank market. At the same time, the commercial banks were experiencing relatively high profits during a time of global financial market turmoil. This anomaly begs for investigation of whether Jamaican banks financing choices is dependent on a bank-based or market-based structure. In a bank-based system, banks rely heavily on deposits while in a market-based system these institutions raise funds in money market.¹ Against this background, this paper seeks to identify banks main source of liquidity and the benefits, if any, of this source.

The Jamaican financial landscape has experienced differing degrees of crises based on stemming from *inter alia* liquidity shortages since independence. Between the early 1970s and late 1980s, Jamaica was one of the most financially repressed countries in the Caribbean (King 2000). Since the liberalization of the financial sector in 1991, there has been easing of quantitative restrictions on credit, savings and interest rates. At the same time, however, the Bank of Jamaica (BOJ) increased the liquid assets ratio for commercial banks from 20.0 percent in 1989 to 33.5 percent in 1992 and finally to 50.0 percent in 1995.

¹ See Schmukler and Vesperoni (2001).

A credit boom accompanied the rapid expansion of the banking sector in the early 1990s and there was a surge in loans for companies in similar economic sectors. In 1993, when a credit bust triggered a dramatic increase in non-performing loans throughout the sector, there emanated the critical importance of holding adequate liquid assets by banks. In the context of the high liquid assets requirement, the discontinuation of quantitative restrictions and deteriorated macroeconomic conditions, the costs of financial intermediation for banks escalated. Consequently, this negatively affected banks' profitability and solvency. With onset of bank runs in the early 1990s, these banks were subsequently closed in an effort to mitigate the contagion risks in the financial sector which was guided by the formation of the Financial Sector Adjustment Company (FINSAC) in 1997. Since the financial crisis of the 1990s, the banking sector has remained financially sound, due largely in part to the enhanced prudential regulatory rules implemented by the BOJ to ensure financial stability.

This paper focuses on the liquid asset holdings of DTIs as well as macroeconomic conditions that influenced the profitability of these institutions. In this context, the paper attempts to give a better understanding of the banking sector with regarding the determinants of bank profitability, with special emphasis on the impact of liquid asset holdings. The paper is structured as follows: Section 2 presents the review of literature underlying bank specific factors that may influence profitability. Section 3 describes the data used in the study and outlines the methodology for the investigation of profitability for banks. Sections 4 and 5 give the estimated results and policy implications.

2.0 Literature Review

There is ample literature surrounding the analysis for the profitability of banks. However there is limited economic research that uses liquidity as an explanatory variable. One of the existing papers that studied the impact of liquid assets on banks' profitability was conducted by Bordeleau and Graham (2010). The authors employed a two-step Generalized Method of Moments (GMM) procedure on a quadratic equation that tested the relationship between liquid assets and bank profitability. The estimation results concluded that there is a non-linear relationship between liquid assets and bank profitability. In addition, there was a negative sign on the slope coefficient for liquid assets which was a non-linear polynomial of order two. This implied a downward-concave parabola and the cost associated with holding more or less liquid assets limited in range around the maximum. The authors suggested that there are other factors other than liquid assets that need to be controlled for that can affect the profitability of these banks. These include exogenous economic conditions, financial structure and regulatory measures set by the central bank.

Similar to Jamaica, Pakistan went through a period of radical changes within the banking sector. These changes include the transition from nationalization, denationalization and privatization of banks. Akhtar *et al.* (2011) focused on bank-specific determinants of conventional banks in Pakistan and how they influence banks' profitability using multivariate regression analysis. The paper's bank-specific factors included non-performing loans (NPLs), bank size, gearing ratio, return on assets (ROA) and return on equity (ROE). Akhtar *et al.* (2011) found NPLs and gearing ratio as having the most significant effect on banks' profitability, when ROE was used as a measure for profitability. In contrast, bank size was a significant indicator for profitability when ROA was used as a proxy for measuring bank's profitability. In addition to bank-specific factors

such as NPLs ratio and capital adequacy ratio (CAR), this paper also examined the effect of macroeconomic variables on bank profitability.

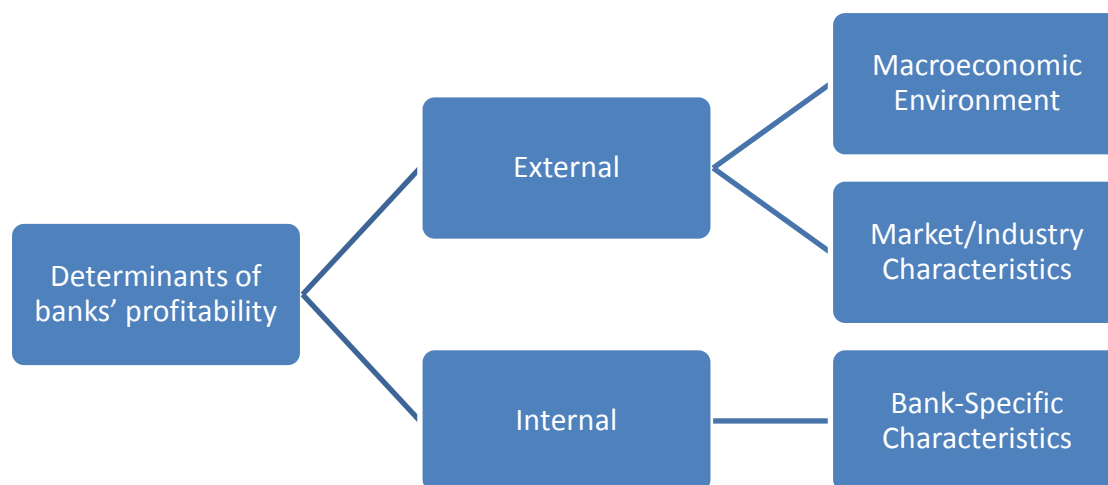
In relation to macroeconomic conditions, Chen and Mahajan (2010) investigated the effects of macroeconomic conditions on corporate cash holdings using an unbalanced panel. The econometric framework was built on the hypothesis that government budget deficits may signal a decrease in GDP growth which as a result may reduce the income effect and ultimately decrease corporate liquidity. The estimation results of Chen and Mahajan (2010) concluded showed that all macro variables, including GDP growth, inflation, government budget deficit and corporate tax, have a consistent impact on corporate liquidity. With regards to Jamaica, an analysis of corporate tax may be insignificant due to its time invariant nature, as it is constant over a long period of time. As such, corporate tax was not included in the current model. However, the analysis incorporated variables such as unemployment and debt, a key contribution to the literature, in a context where these are significant fundamental variables that may have impacted banks profitability due to the country's deteriorated fiscal and economic positions.

3.0 Data and Methodology

The determinants of banks profitability may be categorized as internal factors and external factors. The internal factors relate to bank-specific characteristics while external factors refer to the macro-economic environment (see Figure 1). The bank specific factors used in this analysis were liquid funds, non-performing loans, and capital. GDP, unemployment, inflation and government debt were the external factors used (see Table A1, Appendix). The dependent variable, profitability (π), was measured as return on assets. With regards to the key independent

variable, liquid assets, la , is measured as the ratio of liquid funds, government-issued securities eligible as liquid assets and other eligible liquid assets, relative to the respective bank's total deposits. Macro-economic variables such as unemployment, inflation, the country's debt level and real GDP were used as control variables. In addition, the Herfindahl-Hirschman Index was included to make inference about the level of competition and its indirect impact on the profitability for each bank. While the Treasury bill yield rate and rates on private repurchase agreement were used to capture the involvement in the money market by the sub-sectors. All data were garnered from the Bank of Jamaica.

Figure 1: Determinants of Bank's Profitability



The data set used for estimation is an unbalanced panel of quarterly observations for commercial banks, FIA licensees and building societies from 2000Q1 to 2012Q1. The model was estimated combining two econometric approaches, the first being a Pooled OLS regression for the different

sectors of the DTIs then a panel two step GMM procedure which follows Arellano and Bond (1991) approach. To assist with the problem of endogeneity, lags of all the variables except for the macro-economic variables were used as instruments. A kernel-based method with automatic bandwidth was used to obtain heteroskedastic and autocorrelation consistent (HAC) standard deviation and covariance estimation.

3.1 Econometric Framework

The baseline econometric framework presented will closely match that of Bordeleau and Graham (2010). The dependent variable, profitability (π), was regressed against liquid asset holdings, la , as well as a liquid assets holdings/short-term funding interaction variable. In addition, a set of exogenous macroeconomic variables were included in the model used as control variables, λ .

$$\pi_{i,t} = \beta_0 + \beta_1 la_{i,t-1} + \beta_2 la_{i,t-1} \cdot shortfunding_{i,t} + \lambda\beta + \mu_{i,t} \quad (1)$$

By using a parsimonious model to capture the different sub-sectors' mode of operation an OLS regression was estimated (see equation 1). With regards to the short-term funding variable, the rationale for using this proxy is to test the banks' reliance on short-term funding which could be generated from repurchase agreements, Treasury bill yield rates and market income. Estimation by OLS assesses the individual sub-sectors independently and does not account for any interactions between the respective sub-sectors, as such a GMM was modeled as a robustness test to the OLS results.

To get a holistic point of view of the DTI sector, a dynamic panel was utilized for the estimation. The panel estimation was modeled as follows:

$$\pi_{i,t} = \gamma_0 + \gamma_1 la_{i,t-1} + \gamma_2 la_{i,t-1} \cdot shortfunding_{i,t} + \lambda\beta + \eta_i + v_{i,t} \quad (2)$$

A two-step GMM panel model is estimated to assess the DTI sector as a whole (see equation 2). GMM allows for consistent and efficient estimation as it incorporates the examination of dynamic movements of data that is both time series and cross-sectional with a complete set of individual bank effects, η_i , which controls for all cross-sectional variation. The *a priori* expectation of this model is that taken together, the DTI sector should show more pronounced results vis-à-vis the OLS regression results.

Given the dominance of commercial banks among the DTIs, both in terms of their size and their general aggressiveness in the financial markets, the analysis examined whether commercial banks exhibited a different relationship towards holdings of liquid assets relative to other DTIs. To provide a differential effect of commercial banks versus the other DTIs, the GMM model was adjusted to include a dummy variable that isolates the unique liquidity idiosyncrasies of commercial banks (see equation 3).

$$\pi_{i,t} = \gamma_0 + \gamma_1 la_{i,t-1} + \gamma_2 la_{i,t-1} \cdot shortfunding_{i,t} + la_{i,t-1} \cdot Bank_c + \lambda\beta + \eta_i + \vartheta_{i,t} \quad (3)$$

4.0 Estimated Results – OLS

The OLS estimation results for commercial banks showed non-performing loans, and short-term funding being statistically significant with profitability (see Table 1).

For commercial banks, the liquid asset ratio has no significant impact on profitability. The result could also allude to the fact that liquidity is held to ensure proper cash management, while profits are primarily generated from core business activities (services charges, transaction fees

etc.). At the end of 2005, the liquidity profile gaps for the commercial banks deteriorated. In particular, there was a larger value of liabilities maturing within one year when compared to assets, indicating the commercial banks were susceptible to liquidity risk. This heightened level of liquidity risk was however mitigated by the reduction in the average inter-bank rates by 8.0 per cent, a decline in annual borrowing by 13.8 percent, as well as growth in inter-bank funds and deposits by 36.1 per cent and 14.9 per cent, respectively (see BOJ Financial Stability Report, 2006). In 2010, the Government of Jamaica initiated the Jamaica Debt Exchange (JDX) with the aim of restructuring the high unsustainable debt level. Consequently, the JDX had an impact on the liquidity of these banks as they surrendered their short-maturity, high interest earning securities for lower interest bearing and longer maturity instruments.

With the inclusion of the interaction variable, that is, the liquid asset ratio interacting with short-term funding, there was a positive relationship between the interaction and profitability (see Table 1). As expected, given the nature of these instruments, there is a high degree of dependence on short-term funding to induce profitability. Notably there was a significant increase in the interest rate beginning in 2001 to curb the high inflation rate and depreciating exchange rate. However, a correction to interest rates came in the 3rd quarter of 2003 which consequently led to a decline in the volume of repos. Market income was significant at all levels. This result was expected since interest income is predominantly from core functions *Loans, Advancement and Discounts*. In the same vein, the non-performing loans ratio has a negative effect on profitability at the 5.0 per cent significance level. The non-performing loans ratio has the shape of a minimum parabola which reached a minimum in 2006 (see Figure A1, Appendix). There was an increase in loans over the 12-year sample period. However, non-performing loans

have risen notably in the *Tourism, Construction, Land Development and Agriculture and Fishing* over the past two years.

With the inclusion of the control variables, none of the macroeconomic variables were significantly related to profitability. The rationale may be as a result of loans being concentrated in the personal loans category which overshadow loans to sectors such as *Tourism, Construction, Land Development and Agriculture and Fishing* that are deemed the engine for economic growth.

In conclusion, the commercial banks appear to be operating on a profit motive which is substantiated by the heavy dependence on short-term funding instruments. With regards to the macro-economic conditions, commercial banks' profitability was not directly affected during times of weak economic growth. Instead, non-performing loans is negatively related with real GDP and has a direct impact on profitability (see Table A2, Appendix). The results support the view that economic growth indirectly affects banks profitability.

4.0.1 Building Societies

Similar to the results obtained for commercial banks, liquidity had no significant impact on profitability for building societies. The results show that the relationship between non-performing loans ratio and profitability is negative, in line with *a priori* expectations (see Table 1). In addition, the results indicated that the non-performing loans ratio had a negative significant impact up to eight lags, signaling the persistent nature of NPLs on the sector's profitability. Similar to commercial banks non-performing loans ratio, the graph of this ratio for building societies is somewhat similar to a parabola, but exhibits more volatility than that for commercial banks (see Figure A2).

The effects of the macro-economic variables on building societies' profits are more sensitive when compared to commercial banks; this may be as a result of commercial banks being more capitalized and are thus more resilient to negative shocks. This could be due to the fact that level of capital in commercial banks is much higher than Building Societies. The unemployment variable exhibited a negative effect on profitability at the 5.0 per cent significance level as anticipated (see Table A3, Appendix). The indirect relationship between unemployment and profitability can be further explained by the strong correlation between non-performing loans and unemployment (see Table A2, Appendix). With an increase in unemployment, increased non-performing loans would erode the banks' profitability. With respect to the effect of inflation on bank profitability, the *a priori* expectation is that higher inflation would have a negative impact on profitability since it decreases profits margins. Based on the estimation output, there was an inverse relationship between inflation and profitability at the 10% significance level. This is in line with other related literature such as Jeanne and Rancière (2009) which showed that deterioration in macroeconomic conditions increases the likelihood of market illiquidity. Regarding the interaction variables for liquid asset holdings, there was a positive sign for market income which indicated that there was reliance on short-term funding to spur profitability for the building societies. In addition, interacting liquid assets holding with the Herfindahl-Hirschman index there was a positive effect on profitability. This result is intuitively appealing as it suggests that the market structure of the building society sector has an important bearing on profitability given the level of liquidity. This may also infer that the industry is operating efficiently, in the sense that the allocation of liquid assets are used to improve productivity and hence to induce profitability in such a way that no firm would want to deviate from the sub-sector's overall market activities. Taken together, these results suggest that similar to commercial banks, short-

term funding plays a vital role in providing profits for building societies. In addition, it points out focuses how highly concentrated the industry is with the two leading banks experiencing a substantial amount of profits when compared to their other competitors.

4.0.2 FIA Licensees

The baseline OLS model for the FIA licensees did not produce any significant results for the bank-specific variables, as well as the macro-economic variables as the F-statistics for the various models were not robust.

Table 1: OLS Regression Results for DTIs[^]

$$\pi_{i,t} = \beta_0 + \beta_1 la_{i,t-h} + \beta_2 la_{i,t-j} \cdot shortfunding_{i,t} + \lambda\beta + \mu_{i,t}$$

Variables	CB	BS	FIA's
C	-0.00064	0.001583	-0.004632
LA(-1)	-0.003357	-0.004906	
LA(-2)			0.008995
LA(-3)*REPO_CB	1.611985***		
LA(-2)*REPO_MB			-0.011562
LA(-2)*INCOME	1.560112*	0.893363**	0.06706
LA(-2)*T_BILLS	-0.775512	-1.878473	0.221847
LA(-1)*HI	-0.299462	10.78252*	
LA(-2)*HI			-0.003542
LA_BS(-1)*CAP_BS(-1)		-1.060355	
LOANS_MB(-1)			0.049711***
LOANS_CB(-2)	-0.149419**		
LOANS_BS(-4)		-0.197815	
LOANS_BS(-5)		-0.466471***	
LOANS_BS(-6)		-0.354743**	
LOANS_BS(-7)		-0.385681	
LOANS_BS(-8)		-0.149937	
CAP_MB(-2)			-0.031382
UN(-2)	-0.0543	-0.166143**	-0.021928
INFLATION(-2)	0.024647		
INFLATION(-3)		-0.07284***	0.081264
LEVEL(-2)		-0.015813	-0.034259
LEVEL(-3)	-0.017094		
GRWTH(-3)	0.009096	0.038913	
R-squared	0.6338	0.540474	0.166766
Prob(F-statistic)	0.000063	0.063315	0.717366

OLS Regression: *, **, *** represent 1%, 5% and 10% respectively

[^]CB represents commercial banks; BS: building societies; FIA: FIA licensees

4.1 Estimated Results – GMM

As a robustness test, the model was extended to analyze the DTI sector by implementing a 2-step GMM approach. The issue may be that there is non-orthogonality between the regressors and the error in the OLS estimation. This approach was also implemented based on the shortfall in the OLS model to capture the idiosyncrasies among DTIs.

The results of the GMM report that liquidity, unemployment, and debt level have implications on banks' performance (see Table 2). The variables used in the model were tested for stationarity using the panel unit root tests. The validity of the instruments (i.e. uncorrelated with the error term) was justified based on the J-Statistics value. A test for under-identification (i.e. the excluded instruments are correlated with the endogenous regressors) was also implemented which gave desirable characteristics with respect to the variables being used.

The key results of this extended model showed that liquid assets holding ratio had a negative impact on bank profitability. The negative relationship may infer a significant opportunity cost for holding more liquid funds given their low return relative to other assets. This increases the exposure of banks to interest rate risk. The result of this paper is however in contrast with Bordeleau and Graham (2010), which examined banks in Canada and U.S.A, found a positive relationship between the two variables, suggesting that profitability is improved for banks that hold liquid assets.

The only macroeconomic variables that showed signs of having an impact on profitability are debt level and unemployment. The role of unemployment and the debt level on profitability can be understood from an economic perspective. With unemployment there would be a decrease in national savings resulting from anemic economic growth and or an uninspiring employment

force. Consequently, this may lead to a shortfall in fiscal funding, a slowdown in economic activities and weighing down on investors' confidence. The end result may be a decline in investment bank activities and a reduction in profitability.

4.2 Estimation Result GMM: Difference in the Impact of Liquidity for Commercial Banks relative to other Banks

The results of this empirical exercise would provide solid policy implications as policy makers would be better informed on which sub-sector(s) to target when effecting policy. To execute this test, a dummy variable was introduced and interacted with the liquid asset ratio (see Table 2). The results showed that the coefficient of the interactive dummy was negative and significantly related to profitability. In particular, this result highlights two main points. The first point suggests commercial banks operate more efficiently and are able to derive more profits from holding less liquid assets when compared to other DTIs. Second, the sample period would have been largely influenced by a few financial crises. Over the sample period, commercial banks generally performed better than FIA Licensees and building societies. This idiosyncrasy could possibly be reflecting differences in market perception from market players across the three sub-sectors, and validates the hypothesis on the dominance of commercial banks in the DTI sector.

Table 2: GMM Results for the DTIs

	$\pi_{i,t} = \gamma_0 + \gamma_1 la_{i,t-1} + \gamma_2 la_{i,t-1} \cdot shortfunding_{i,t} + \lambda\beta + \eta_i + v_{i,t}$	$\pi_{i,t} = \gamma_0 + \gamma_1 la_{i,t-1} + \gamma_2 la_{i,t-1} \cdot shortfunding_{i,t} + la_{i,t-1} \cdot Bank_c + \lambda\beta + \eta_i + \vartheta_{i,t}$
Variables		
C	-0.000915	-0.005904
LA(-1)	-0.021198***	-0.01462**
LA(-1)*REPO	0.069684	-0.159918
LOANS(-2)	-0.017474	-0.044871
LA(-1)*INCOME	-0.06847	-0.324622
UN(-2)	-0.132456***	-0.176543*
LEVEL(-3)	-0.105937**	-0.067551**
GRWTH(-3)	0.020723	0.079098**
CAP	0.063315	0.048015***
INFLATION(-1)	0.019189	0.215216
LA(-2)*BANKID		-0.061635**
R-squared	0.183472	0.184996
p-value of Hansens J-Statistics	0.449	0.491

5.0 Conclusion and Policy Implications

This paper presented empirical evidence using OLS for each sub-sector, which provided evidence that liquid asset holdings by itself does not have any statistical significant on profitability but when interacted with short-term funding, it had a positive effect on profitability for commercial banks. Conceptually, this result is consistent with the idea of commercial banks depending heavily on government securities for a number of years. Of note, with the introduction of the JDX there has been reduced reliance on investment in government securities. The results indicated that the two largest commercial banks have adjusted their business model with regards to the association of liquid asset holdings and profitability. This is further corroborated by the

GMM for a panel of twelve banks including: six commercial banks, four building societies and two FIA licensees.

The results of the paper suggests that that the Bank should further examine how monetary policy impacts unemployment given the relatively large negative relationship between unemployment and profitability. More generally, this paper marks the first attempt to empirically address the relationship between liquid assets and bank profitability on Jamaican banks. This paper should motivate additional work to incorporate non-banks to capture the entire financial system. In addition, it would also be useful from a policy perspective to formulate a model that carefully determines the equilibrium levels of liquid assets and profits.

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A1 (Appendix 1)

Figure A1: Non-performing Loans Ratio - Commercial Banks

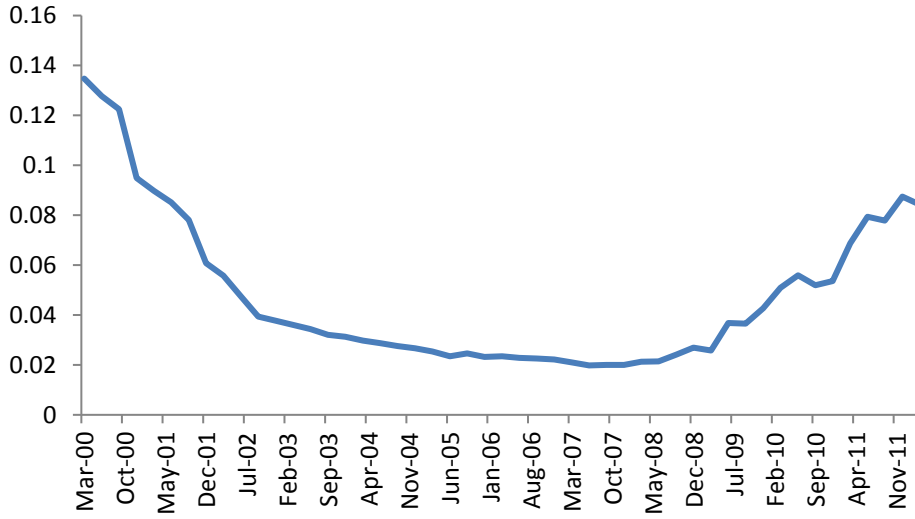


Figure A2: Non-performing Loans Ratio – FIA Licensees

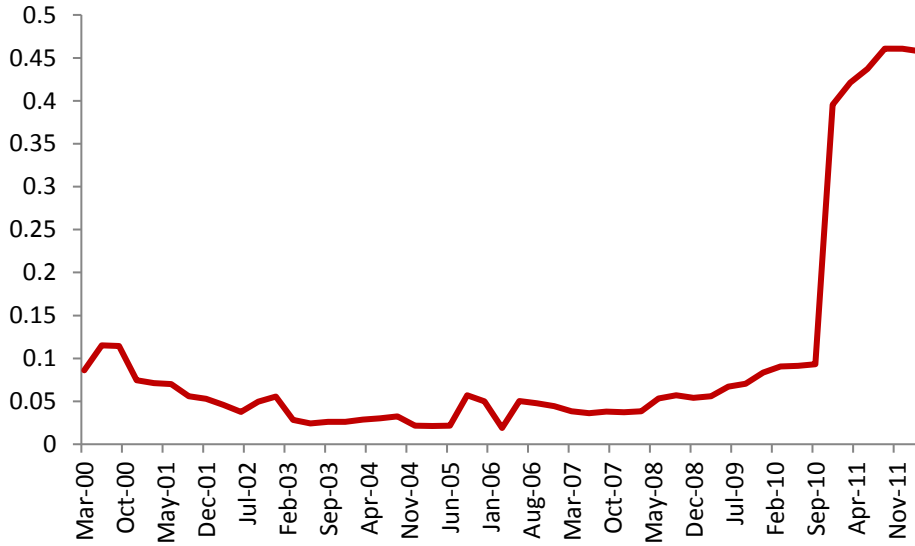


Figure A3: Non-performing Loans Ratio - Building Societies

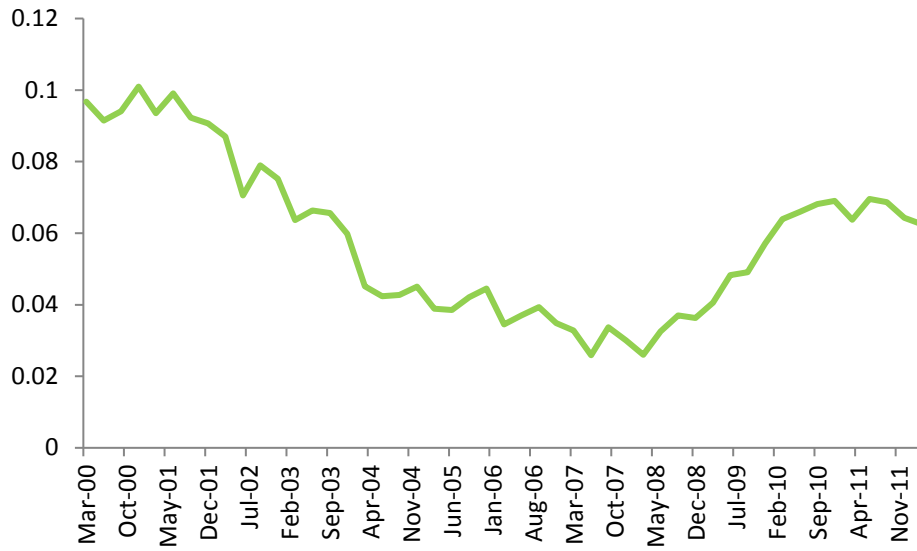


Figure A4: Non-performing Loans Ratio - DTIs

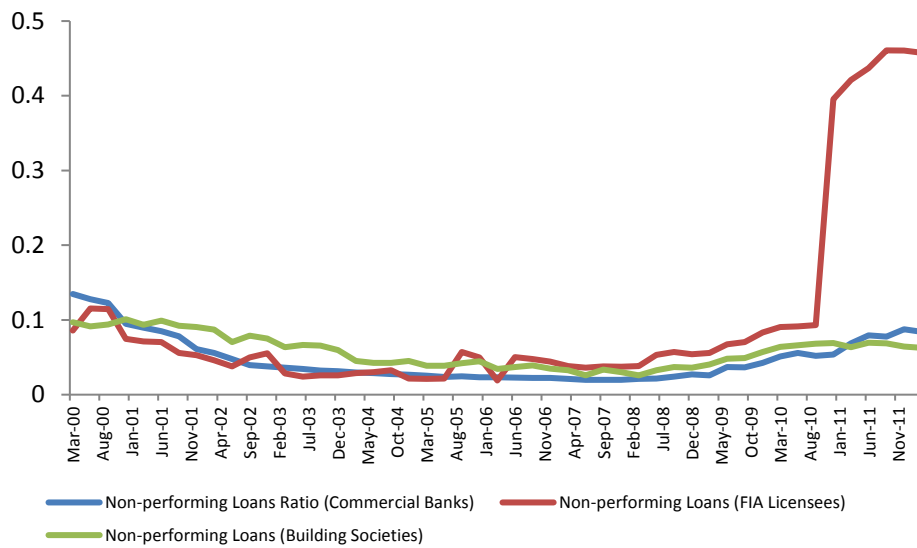


Figure A5: Pre- tax Annualized ROA - DTIs

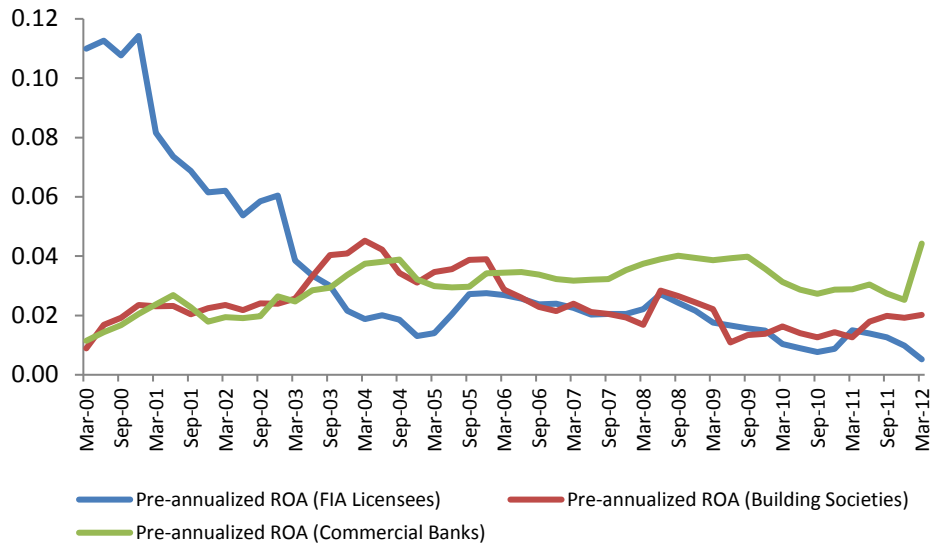


Figure A6: Liquid Assets Holdings DTIs

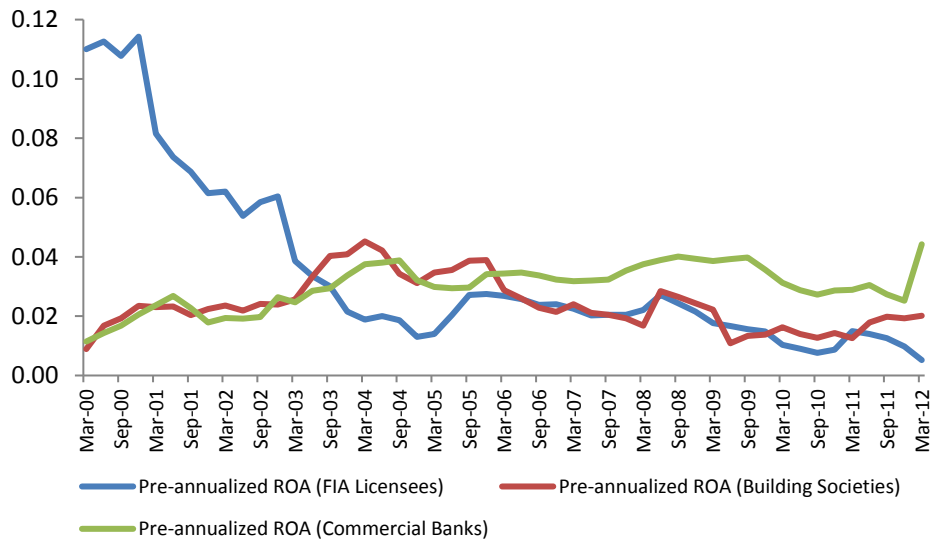


Table A1: Variable Definitions

Symbol	Definitions
ROA	Pre-tax annualized return on total assets
La	Liquid assets as a share of deposits
Grwth	Quarter-over-quarter of real GDP
Inflation	Quarter-over-quarter growth rate of core CPI
Un	Unemployment rate
Level	Quarter-over-quarter total stock of debt
CAP	Capital to Weighted Assets Ratio
HHI	Measure the size of a firm in relation to its industry
Repo	Reverse repurchase agreements as a share of total liabilities
Market Income	trading and investment banking related revenues as a share of gross income (interest income and non-interest income)

Table A2: Variables Descriptive Statistics

	Descriptive Statistics*	
Symbol	Sample mean	Standard Deviation
ROA_BS	0.02406	0.008827
ROA_CB	0.030063	0.007472
ROA_MB	0.034082	0.029149
LA_BS	0.25448	0.075107
LA_CB	0.441319	0.06196
LA_MB	0.341014	0.121573
Grwth	181993.6	7228.305
Inflation	2.635311	1.763969
Un	12.36133	1.985272
Level	906339.4	398095.4
CAP_BS	0.001234	0.006076
CAP_CB	0.001595	0.011778
CAP_MB	-0.001347	0.020356
HHI_BS	4339.926	223.3716
HHI_CB	3225.346	310.6253
HHI_MB	14373.81	17206.89
Repo_BS	0	0.001427
Repo_CB	-0.000548	0.012704
Repo_MB	0.010592	0.090676
Income_BS	0.503878	0.10704
Income_CB	0.549104	0.150732
Income_MB	0.40898	0.114878

*CB- Commercial banks; BS – Building societies; MB – FIA Licensees

APPENDIX B

Table B1: Correlation Matrix for Building Societies

	ROA	CAR	HHI	Inflation	Real GDP	Repos	Total Debt	Treasury Bills	Unemployment	NPL Ratio	Market Income	LAR
ROA	1	0.461816	0.188704	0.162136	0.061593	0.17785	0.381881	0.26107	-0.198118	0.292583	0.497089	-0.1614
CAR	0.461816	1	0.559918	0.163881	0.712466	-0.49944	0.419964	0.467187	-0.736422	0.801297	0.324976	0.58292
HHI	-0.1887	0.559918	1	0.202987	0.742629	-0.48389	0.86216	0.470219	-0.707161	-0.64862	0.812735	0.79955
Inflation	0.162136	0.163881	0.202987	1	0.057672	-0.07351	0.023293	0.041312	-0.27711	0.231622	0.021108	0.19834
Real GDP	0.061593	0.712466	0.742629	0.057672	1	-0.40286	0.564787	0.362385	-0.783513	0.867129	0.536211	0.81412
Repos	0.17785	0.499438	0.483889	0.073512	0.402863	1	0.416168	0.539262	0.393379	0.38092	0.494305	-0.5345
Total Debt	-0.38188	0.419964	0.86216	0.023293	0.564787	-0.41617	1	0.707558	-0.42654	0.367787	0.900368	0.56625
Treasury Bills	0.26107	0.467187	0.470219	0.041312	0.362385	0.539262	0.707558	1	0.206835	0.185304	0.725425	-0.3718
Unemployment	-0.19812	0.736422	0.707161	-0.27711	0.783513	0.393379	-0.42654	0.206835	1	0.88105	0.368805	-0.8146
NPL Ratio	-0.29258	0.801297	-0.64862	0.231622	0.867129	0.38092	0.367787	0.185304	0.88105	1	0.351373	-0.7683
Market Income	-0.49709	0.324976	0.812735	0.021108	0.536211	-0.49431	0.900368	0.725425	-0.368805	0.351373	1	0.61721
LAR	-0.16145	0.582923	0.79955	0.198339	0.814118	-0.53447	0.566247	0.371754	-0.814599	0.768279	0.61721	1

Table B2: Correlation Matrix for Commercial Banks

	ROA	CAR	HHI	Inflation	Market Income	Real GDP	NPL Ratio	Repos	Total Debt	Treasury Bills	Unemployment	LAR
ROA	1	0.3962	0.650901	0.248447	0.621867	0.744676	0.670592	-0.19857	0.530377	0.146838	-0.725591	-0.5008
CAR	0.3962	1	0.666752	0.188673	0.788207	0.3861	0.055568	0.442777	0.835168	0.721722	-0.229332	-0.4821
HHI	-0.6509	0.666752	1	0.027577	0.881762	-0.70095	0.58687	0.327499	-0.843318	0.50142	0.642123	0.54594
Inflation	0.248447	0.188673	0.027577	1	0.051756	0.057672	0.256531	0.040938	-0.023293	0.041312	-0.27711	-0.0171
Market Income	0.621867	0.788207	0.881762	0.051756	1	0.721812	0.350709	0.622116	0.946817	-0.72916	-0.614726	-0.6986
Real GDP	0.744676	0.3861	0.700952	0.057672	0.721812	1	0.643409	0.378724	0.564787	0.362385	-0.783513	-0.5868
NPL Ratio	-0.67059	0.055568	0.58687	0.256531	0.350709	-0.64341	1	0.123564	-0.161701	0.045978	0.751664	0.24473
Repos	-0.19857	0.442777	0.327499	0.040938	0.622116	-0.37872	0.123564	1	-0.592394	0.594619	0.271491	0.54452
Total Debt	0.530377	0.835168	0.843318	0.023293	0.946817	0.564787	0.161701	0.592394	1	0.707558	-0.42654	-0.6424
Treasury Bills	-0.14684	0.721722	0.50142	0.041312	-0.72916	-0.36239	0.045978	0.594619	-0.707558	1	0.206835	0.43766
Unemployment	-0.72559	0.229332	0.642123	-0.27711	0.614726	-0.78351	0.751664	0.271491	-0.42654	0.206835	1	0.46522
LAR	-0.5008	0.482103	0.545944	0.017101	0.698559	-0.58681	0.244732	0.544521	-0.642412	0.437656	0.465221	1

Table B3: Correlation Matrix for FIA Licensees

	ROA	CAR	HHI	Inflation	Market Income	Real GDP	NPL Ratio	Repos	Total Debt	Treasury Bills	Unemployment	LAR
ROA	1	0.744437	0.455772	-0.16013	0.574849	-0.74112	0.201382	0.638425	-0.76134	0.486722	0.728426	0.5331
CAR	0.744437	1	0.065577	-0.18625	0.197025	-0.55776	0.304301	0.313701	-0.243317	0.042688	0.630585	0.34473
HHI	-0.45577	0.065577	1	0.129552	0.480393	0.255587	0.838329	0.394196	0.888218	0.613416	-0.050168	-0.2899
Inflation	-0.16013	-0.18625	0.129552	1	0.141978	0.057672	0.213876	0.005847	-0.023293	0.041312	-0.27711	0.02591
Market Income	-0.57485	0.197025	0.480393	0.141978	1	0.634835	0.172243	0.577297	0.694424	0.511338	-0.594131	-0.6688
Real GDP	-0.74112	0.557763	0.255587	0.057672	0.634835	1	0.057735	0.720425	0.564787	0.362385	-0.783513	-0.5918
NPL Ratio	-0.20138	0.304301	0.838329	0.213876	0.172243	0.057735	1	0.358197	0.648399	0.682077	0.159804	0.07351
Repos	-0.63843	0.313701	0.394196	0.005847	0.577297	0.720425	0.358197	1	0.651781	0.663014	-0.594711	-0.3638
Total Debt	-0.76134	0.243317	0.888218	0.023293	0.694424	0.564787	0.648399	0.651781	1	0.707558	-0.42654	-0.5147
Treasury Debt	0.486722	0.042688	0.613416	0.041312	0.511338	-0.36239	0.682077	0.663014	-0.707558	1	0.206835	0.19679
Unemployment	0.728426	0.630585	0.050168	-0.27711	0.594131	-0.78351	0.159804	0.594711	-0.42654	0.206835	1	0.54554
LAR	0.5331	0.344732	0.289891	0.02591	0.668843	-0.59181	0.073514	0.363771	-0.5147	0.196791	0.545535	1