

**‘Global Financial Market Tribulations- Upshots on Major Banks’ costs and profits - A Mauritian Perspective.**

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**ABSTRACT**

*This paper appraises the upshots on Mauritian Banks following recent tribulations in global financial markets using data for the period 2000-2011. Using data from Banks’ annual reports, a sample of 9 banks that existed during this period is taken to investigate the impact of recent tribulations in global financial markets on the costs and profits of the banks. Plain OLS results suggest that financial crisis has had no impact on the performance of the domestic banking sector as shown by the insignificance of the financial dummy variable. To have a more efficient and reliable estimate, the model has been tested using GMM. The GMM results also confirm the insignificance of the financial crisis dummy, which indicates that the Mauritian banking sector is very resilient to external economic and financial shocks.*

**Key Words: Mauritius, Banks, Global Financial Crisis, Panel.**

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## 1. Introduction

The credit turmoil that started in 2007 and intensified in 2008 imposed major strains on banks around the world. As the major distractions took place in markets for complicated assets and wholesale funding, many nations with sophisticated financial systems (such as most OECD members) were particularly exposed. The impacts of the chaos extended well beyond the financial sector. Countries with severe banking sector problems experienced spillovers to the real sector from a credit crunch, fiscal shortfalls due to reduced tax bases, and sometimes balance of payment problems associated with capital outflows. The linkages between the financial sector and the real economy created often significant feedback loops (Bayoumi and Melander, 2008).

There have been a lot of papers written with respect to the impact of financial crisis on bank performance, viz, Berger (1995) and Ramírez et al (2008) among others, albeit literature on small island developing states like Mauritius is rather scant. Even if there are some studies carried out, there are doubts about the methodologies applied and biasedness in terms of incorrect functional forms. The domestic banking sector of Mauritius remains faced with some vulnerability. Weaknesses in the banking system of a country, whether developing or developed, can threaten its financial stability. Moreover, since banks have an important grip on the financial sector of Mauritius, it is essential to know whether the banking system is in fact sound and stable during and in the aftermath of the crisis.

To close the gaps in the literature, the aims and objectives of this paper are: to identify the factors affecting the performance of banks in Mauritius during the financial crisis; to examine to what extent the Mauritian banking sector has been affected by external financial shocks and to make policy recommendations.

To achieve its objectives, the paper is structured as follows: part 2 gives the literature review, part 3 gives the methodology, sources of data and analysis of findings and part 4 concludes the paper together with policy recommendations.

## 2. Literature Review

Theories elucidating the link between financial instabilities and banking performance are rather scarce, albeit there are a large variety of models in which bank runs are triggered by real shocks to the economy. In Vong and Chan's (2006) seminal model, there is asymmetric information about aggregate loan risk. Vyas et al (2008) model assumes that depositors receive a noisy signal about the value of bank assets. If the signal suggests the value of assets is low, a bank run ensues. Solvent banks suspend convertibility and pay a cost to verify their solvency to investors.

Moreover, Rasiah (2010) develop a model of business cycle risk with symmetric information. They assume that the prospects of banks are observable, but not contractible. Motivated by Staikouras and Wood (2003) empirical findings, they assume that everyone, including depositors, can observe a leading economic indicator that is perfectly correlated with future asset returns. Banks invest in two kinds of assets, a risky, illiquid asset and a safe, liquid asset. The short asset can also be held by individuals because the long asset is completely illiquid and thus, default causes no deadweight loss and the first-best allocation is achieved through a competitive banking system using demand deposit contracts.

Turning to empirical literature, Molyneux and Thornton (1992) first investigate the determinants of bank profitability comprehensively in a panel of countries using GMM framework. Using a sample of 18 European countries for the period 1986-1989, a significant positive relation is found between profitability and the interest rate levels in each country, concentration and government ownership. Despite intensifying competition there is significant persistence of abnormal profit from year to year.

Using multivariate regression analysis, Demergüç-Kunt and Huizingha (1999) assess the determinants of bank interest margins for 80 countries for the period 1988-1995, the determinants embracing bank characteristics, macroeconomic conditions, taxation, regulations, financial structure and legal indicators. They find that higher banks with high bank assets to GDP ratio and lower concentration ratio have lower profits. Domestic banks were least profitable than foreign owned banks in developing countries than in developed countries. Using similar methodology, Demergüç-Kunt and Huizingha (2001) examine the

effect of financial development and structure on bank profits for various developed and developing countries for the period 199-1997. They find that financial development is of utmost importance in explaining bank performance. Explicitly, it is found that higher bank development is linked to low profitability through acute competition. Yet, it is found that there is a positive relationship between stock market development and profitability of the banks, signifying complementarities between bank and stock market.

Using multivariate regression analysis, Bashir (2000) assesses the internal and external determinants of eight Islamic Banks' profitability and efficiency in the Middle East for the period 1993-1998, with macroeconomic environment, financial market situation and taxation as control factors. He finds that high profitability is the result of high leverage and high loans to asset ratios. Foreign owned banks are also seen as most profitable as domestic banks. Also, while taxation has a negative association with profitability, macroeconomic variables and stock market development have a positive one.

Using pooled fixed effects framework, Morck et al (2009) assess the determinants of bank profitability for six European Union countries and the US for the period 1988–95 and find that macroeconomic instability and regulations have a significant impact on profitability. They also convey a negative causality between bank solvency as depicted by high capital to asset ratio and lower cost of intermediation as depicted by low interest margins.

Using multivariate regression analysis, Abreu and Mendes (2002) examine a set of European countries in the nineties and find that highly capital banks were more profitable owing to lower expected bankruptcy costs. As macroeconomic indicators, albeit negative, inflation and unemployment rates are found to be significant.

Goddard et al (2004) examine European Banks' profitability for the period 1992-1998 using GMM framework. Their model includes size, diversification, risk and ownership type as well as dynamic effects as determinants of profits. They find that although competition is intense, there exists significant persistence in banks' supernormal profits over the years. Also, they find that the size profitability relationship for the banks are quite inconsistent and unsystematic; capital-assets ratio and profitability is positive and the relationship between the importance of off-balance sheet business in a bank's portfolio and profitability is positive for the only for UK.

In addition, Albertazzi, et al.(2006) also use GMM technique to assess the behaviour of South Eastern European banks for the period 1998-2002 and find that the improvement of bank profits in these countries necessitates efficiency and new risk management standards, thereby affecting profits. Also, whilst the significance of macroeconomic determinants is mixed, concentration is found to affect profits positively.

Beckman (2007) examines the structural and cyclical determinants of bank profitability for 16 nations in Western Europe for the period 1979-2003 using the Hausman-Taylor instrument variable estimator. He finds that financial structure and higher diversification regarding banks' income sources are significant. Yet, concentration of national banking systems, does affect profitability significantly, albeit business cycle effect as depicted by lagged GDP growth, shows a significant procyclical effect on bank profits.

Flamini et al (2009) examine the determinants of 389 banks in 41 Sub-Saharan African countries for a ten year period ending 2006 and finds that highly profitable banks are those with large size, activity diversification and private ownership, albeit those with high credit risks tend to be less profitable. It is also found that macroeconomic policies that encourage price stability and stable economic growth increase credit growth and thus profits. Using GMM techniques, it is also found that there is moderate persistence in profitability. Further, Granger causality from profitability to capital occurs with significant lag suggesting that profits are not retained for recapitalizing the banks and implying that higher capital requirements are needed to improve financial stability.

### **3. Methodology, Findings, Analysis & Discussion**

Data was obtained from the Registrar Of Companies and from the Annual Reports of the banks taken in the sample. The sample data starts in 2000 and ends in 2011. Given that some banks started operations in the late 2000's, only nine banks are taken in the sample.

The study is a panel data analysis. According to Mouchart (2004), panel data analysis is more advantageous. Panel data analysis considers the fact that the banks differ in terms of accounting policies and standards. Panel data analysis removes all biases associated with the need to averaging or aggregation since in panel data; all banks' data are included.

Moreover, to achieve the aim of this project, the foregoing equation is estimated using GMM. When fixed or random models are employed, a difficulty might arise if a lagged dependent variable (or other regressor) is important, especially when there are few time periods and many observations. Their coefficients might be seriously biased if the regressors are correlated with the lagged dependent variable to some extent. Hence, Arellano and Bond (1991) propose GMM for dynamic panel estimation to address this problem. The GMM is based on moment functions that depend on observable random variables and unknown parameters and which have zero expectation in the population when evaluated at the true parameters. It removes the panel-specific heterogeneity by first differencing the regression equation. In order to be able to use the GMM, it needs to be ensured that the model is not subject to serial correlation of order two and that the instruments used are valid. The Sargan test estimates whether there is any problem with the validity of instruments.

The Econometric Model is as follows:

$$P_{it} = \beta_1 + \beta_2 BS_{it} + \beta_3 FS_t + \beta_4 ME_t + \beta_5 Dt + \epsilon_{it}$$

Where,  $P_{it}$  = Profitability of banks for bank  $i$  at time  $t$

$BS_{it}$  = Bank-specific variables for bank  $i$  at time  $t$

$FS_t$  = Financial structure indicators

$ME_t$  = Macroeconomic factors

$Dt$  = dummy variable for financial crisis at time  $t$  where

$\beta_1$  = parameters

$\epsilon_{it}$  = error term

Therefore,

$$ROE_{it} = \beta_1 + \beta_2 CS_{it} + \beta_3 LA_{it} + \beta_4 MC_t + \beta_5 GR_t + \beta_6 INF_t + \beta_7 IR_t + \beta_8 Dt + \epsilon_{it}$$

Where,  $ROE_{it}$  = profitability proxy

$CS_{it}$  = capital strength for bank  $i$  at time  $t$

$LA_{it}$  = loans to assets ratio for bank  $i$  at time  $t$

$MC_t$  = market capitalisation as a percentage of GDP

$GR_t$  = real growth rate

$INF_t$  = inflation rate

$IR_t$  = interest rate

$D_t$  = dummy variable for financial crisis at time  $t$

### 3.1. Definition of Variables

#### Dependent Variable

- *Return on Equity*

The measure of performance, i.e. the dependent variable, used in the regression is ROE. It measures how well a company utilises reinvested earnings to create additional earnings. It is used as a general indication of the efficiency of the bank. ROE is calculated as net operating income divided by total shareholders' equity. In other words, ROE shows how much profit the bank can generate with the resources provided by its shareholders. Higher ROE is expected to be accompanied by greater profitability.

#### Independent Variables

- *Capital Strength*

The first independent variable in the regression is capital strength, which represents one of the bank-specific variables. A common measure to analyse the capital strength of a bank is the equity-to-assets ratio. It is calculated as shareholders' equity divided by total assets. It is expected that the higher the ratio, the lower the need for external funding and hence, the higher the profitability of the bank. Further, well-capitalised banks face lower costs of going bankrupt which reduces their costs of funding.

- *Bank Loan- to-Assets Ratio*

Another bank-specific variable is the loans-to-assets ratio, which is derived by dividing bank loans and advances by total assets. Loans and advances are expected to be the main source of income. Therefore, they are supposed to have a positive impact on bank performance. Other things remaining constant, the more deposits are transformed into loans, the higher the interest margin and profits. However, if a bank has to increase risk in order to have a greater loan-to-asset ratio, then profits might decrease.

- *Stock Market Development*

The financial structure indicator employed is stock market development. It can be measured by stock market capitalisation as a percentage of GDP. This can also serve as a measure of the size of the equity market. Stock market development may improve bank performance as, for instance, stock markets provide information about firms that is also useful to banks. Alternatively, the legal and regulatory environment that makes stock market development possible may also improve the functioning of banks. Hence, it is expected to positively influence bank profitability.

- *Economic Growth*

One of the macroeconomic variables used is economic growth. Real growth rate is used as the proxy for economic growth. It is a measure of the total economic activity and is used to determine whether an economy is growing faster or slower than the quarter before, or the year before. It is expected to have an impact on various factors related to the supply and demand for loans and deposits. When there is economic boom, more bank credit will be demanded than when there is recession. It is anticipated to have a positive impact on banks' performance according to the literature associated with economic growth and banking performance.

- *Inflation*

Another macroeconomic variable is inflation. Some studies have reported a positive relationship between inflation and bank profitability as they deem that high inflation rates are generally accompanied by high loan interest rates and therefore, high incomes. On the other hand, other studies have agreed that banks tend to not profit in inflationary environments. This all depends on whether the inflation is anticipated or unanticipated.

- *Interest Rate*

Interest rate is being projected as an independent variable and also the macroeconomic variable. In general, interest rate is expected to be positively related to bank profits, i.e. a rise in interest rate would normally result in an increase in bank profits, because when interest rate is high, the returns which banks earn on their assets acquired as well as loans given rise. On the other hand, a rise in interest rate can also result in a decline in bank profitability due to mismatching of the maturities of their assets and liabilities.



• *Financial Crisis 2008*

The financial crisis which occurred in 2008 is being represented as a Dummy variable. Though overall bank performance from July 2007 to December 2008 was the worst since at least the Great Depression, there is significant variation in the cross-section of stock returns of large banks across the world during that period. We use this variation to evaluate the importance of factors that have been discussed as having contributed to the poor performance of banks during the credit crisis. More specifically, we investigate whether bank performance is related to bank-level governance, country-level governance, country-level regulation, and bank balance sheet and profitability characteristics before the crisis

**3.2. Results and Analysis.**

The OLS results from Stata 12 provides the following estimates

Predictand- ROE	OLS Estimates at 1% confidence interval		
	Coefficient	t- statistic	P value
Capital strength	-8.19	2.81	0.000
Loans to assets ratio	-0.432	3.31	0.001
Market capitalization as a % of GDP	-0.023	1.93	0.072
Real growth Rate	-0.00735	1.82	0.084
Inflation Rate	0.0125	1.09	0.0751
Interest rate	0.00759	2.11	0.035
Financial Crisis Dummy	0.00222	0.598	0.523
Constant	0.02452	2.35	0.037
F value	4.7400		
Prob> F	0.0001	R-Squared	0.1327

*Source: Stata 12 output*

### **Analysis of results**

The P-Value of the model stands at 0.0001, less than 0.05, depicting a statistically significant relationship between the regressands and the regressors. The R-Squared figure of 0.1327 shows that the model explains 13.27% of variance in banking performance. The P-Values are the two tail values for each parameter estimates and test the hypothesis that the estimates are different from zero. To reject the hypothesis, p-values have to be lower than 0.05. After correcting for heteroskedasticity, from the OLS estimates with robust SE, only capital strength, loans to assets ratio and interest rates are statistically significant in explaining banking performance, with p-values of less than 0.05. This means financial crisis did not have an impact on the performance of Mauritian banks during the period of study. The diagnostics reveal no misspecification and no multicollinearity problems.

#### ▪ **Capital Strength**

The t-statistic of capital strength is very large at 8.19, indicating that it has significant influence on the profitability of banks. Its p-value is less than 0.01, which means that it is significant at 1% level. However, although most theories explain a positive relationship between the two, our results show a negative one. This means that a reduction in capital strength by 1% will increase ROE . This is because a higher capital ratio implies a lower leverage multiplier and hence, a lower ROE. This is consistent with the study of Tregenna (2009) who also reported a negative relationship between bank profitability and capitalisation ratio. Additionally, Goddard *et al.* (2004) state that high capital ratios are a signal of low risk as the banks are supposed to operate overcautiously and thereby ignore potential profitable investment opportunities, which would result in a negative capital-earnings relationship since investors demand a lower return on their capital in exchange for lower risk.

- **Loans-to-assets ratio**

The loans-to-asset ratio is seen to be negative and significant at 1% with a t-statistic of -3.31, a coefficient of -0.432 and a p-value of 0.001. This implies that a 1% rise in the loans-to-assets ratio will entail a 0.432% decrease in return on equity. Generally, loans are associated with higher profits as they are a source of revenue. However, loans also have higher operational costs as they need to be originated, serviced and monitored. Furthermore, banks which are exposed to high-risk loans also have a higher accumulation of unpaid loans, i.e. high loans-to-assets ratios can reduce liquidity and increase the number of marginal borrowers that default. These loan losses cause a decline in bank returns; hence, the negative impact of loan ratio on bank profitability. This negative t-statistic is consistent with the findings of Heffernan and Fu (2008) and Bashir and Hassan (2003), who also observed a similar relationship between loans-to-assets ratio and profitability.

- **Market Capitalisation as a % of GDP**

Market capitalisation to GDP ratio has a negative coefficient as well. It indicates that as stock market development increases by 1%, ROE falls by 0.23%. Since it is argued that there is a positive association between market capitalisation and competition, a highly developed non-banking financial sector may apply competitive pressure on the banking sector. Hence, banks profits fall with higher market capitalisation. However, this coefficient is not significant, with a p-value greater than 0.05 and a t-ratio lower than 1.96. This means that financial market development does not have much influence over banks' profits.

- **Real growth rate**

The coefficient for economic growth is also observed to be negative, which signifies that a reduction of 1% in economic growth would result in a fall of 0.735% in return. But, since the coefficient is insignificant (p-value > 0.05), economic growth would not impact considerably on bank profitability. This finding contrasts sharply with most studies on bank performance determinants, where economic growth is considered to have positive influence on

profitability. However, it is consistent with the result of Demirguc-Kunt and Huizinga (1999) who also found an insignificant relation between growth rate and bank profitability in their study. This negative impact on profitability may be due to the effect of the recent financial crisis, which caused a decline in economic growth.

- **Inflation rate**

On the other hand, inflation rate has a positive but again, insignificant coefficient, which implies that it does not impact greatly on banks' profits. A 1% rise in inflation would result in a 1.25% rise in bank returns. Since, there is a positive relationship between profits and inflation, this means that the management of banks are able to satisfactorily, though not entirely, forecast future inflation, which in turn entails the appropriate adjustment of interest rates to achieve higher profits. This theory is consistent with the findings of Flamini *et al.* (2009).

- **Interest rate**

Among the macroeconomic variables, the only significant one is interest rate, its coefficient being significant at 5% level, with its p-value at 0.035 and t-statistic being of 2.11. A 1% rise in interest rate would imply a 0.759% increase in bank profits. As mentioned above, this signifies that it has been properly adjusted for inflation to ensure profits. Interest rate normally has a positive impact on bank profitability as banks, in general, tend to increase their lending rates sooner by more percentage points than their deposit rates. Moreover, the increase in interest rates will raise the real debt burden on borrowers, which in turn, may lower asset quality, thus inducing banks to charge a higher interest margin in order to compensate for the inherent risk. This result is consistent with the findings of both Demirguc-Kunt and Huizinga (1999) and Staikouras and Wood (2003).

- Financial Crisis Dummy

The coefficient on financial crisis dummy is insignificant and stands at 0.00222, indicating that financial crisis did not influence the performance of the Mauritian banks during the period of study. The t-statistic stood at 0.598 and the p-value stood at 0.523, confirming the insignificance of this variable in explaining the performance of the banks.

After running the GMM the results of the regression equation using Arellano and Bond's GMM estimation are as follows:

Predictors	GMM Estimates			
	Coefficient	SE	z	P value
Lagged ROE	-3.2185	3.125	5.246	0.0687
Capital strength	-7.5362	2.984 5	3.12	0.0000
Loans to assets ratio	-0.5781	2.845 0	3.540	0.0001
Market capitalization as a % of GDP	-2.439	2.845	2.835	0.0986
Real growth Rate	-0.0254	1.985 4	2.124	0.0000
Inflation Rate	2.5360	3.548	1.098 5	0.2546
Interest rate	1.9625	3.542 3	1.085 6	0.3589
Financial Crisis Dummy	-9.653	5.458	2.835	0.5689
Constant	0.823	5.230	5.42	0.6852
<b>Wald Chi2(5)=13.97</b> <b>Sargan test of over identifying restrictions</b> H0: over identifying restrictions are valid chi2(54) = 53.4215 Prob > chi2 = 0.6125				

*Source: Stata 12 output*

The results from the GMM also confirms the insignificance of the financial crisis dummy in explaining the performance of Mauritian Banks during the period of study, which means that the Mauritian banks have been resilient to external shocks. They have got well designed and

practiced risk management techniques and strategies in place to immune themselves from such kind of shocks. However, Capital strength, loans to assets ratio and real growth rate are the only factors significant in explaining the performance of the banks during the period of study.

The Sargan test does not detect any problem with validity as it estimates a significant coefficient and a p-value greater than 0.05. Therefore, as the null hypothesis is not rejected, the underlying over-identifying restrictions are valid. The Arellano-Bond test checks for zero autocorrelation in first-differenced orders. If second-order autocorrelation was present, it would imply that there was inconsistency in the model. However, this is not the case as the results show that neither first-order nor second-order autocorrelation is present in the model as the p-values for both orders are greater than 0.05. Hence, there is no evidence of model misspecification.

#### **4. Conclusion and Recommendations.**

In this study, an analysis of the impact of the global financial has been made on the performance of the Mauritian banking sector. Plain OLS results suggest that financial crisis has had no impact on the performance of the domestic banking sector as shown by the insignificance of the financial dummy variable. To have a more efficient and reliable estimate, the model has been tested using GMM. The GMM results also confirm the insignificance of the financial crisis dummy, which indicates that the Mauritian banking sector is very resilient to external economic and financial shocks. The results, however, should be interpreted with caution. First, the number of banks in the sample stands only at nine, for the simple reason of data availability and presently we have 21 banks in Mauritius. Also, some banking indicators from some major banks have started to deteriorate as from last year, viz the non performing loans ratio, which might mean that the financial crisis could have had a lagged effect on the banks. Future research should try to take more recent data and investigate this lagged effect.

In the light of the results, based on data 2000-2011, a good recommendation cannot be pertaining to the domestic banking sector. However, if some recent banking indicators are taken care of, it is recommended that the central bank and the individual banks adopts

policies to cap exposures to affected economic sectors for instance, construction sector and textiles which have contributed to the deterioration in banking indicators.

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