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# *ЭМПИРИЧЕСКАЯ ОЦЕНКА ВЛИЯНИЯ ТРЕБОВАНИЙ БАЗЕЛЬ III НА БАЛАНСОВУЮ СТОИМОСТЬ БАНКОВ С ИСПОЛЬЗОВАНИЕМ ЧЕТЫРЕХ КЛЮЧЕВЫХ МОДЕЛЕЙ*

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**Аннотация**

В данной статье оценивается влияние требований капитала и ликвидности Базеля III на балансовую стоимость активов банков. Используется эмпирическая оценка данных одномерного, а также многовариантного анализа в качестве способа изучения аномальной доходности, а также рассматривается ее влияние на банки с точки зрения размера, капитала и ликвидности.

**Ключевые слова:** Базельские соглашения, банк, ликвидность, капитал

# *AN EMPIRICAL ASSESSMENT OF THE EFFECTS OF BASEL III REQUIREMENTS ON BANKS BOOK VALUE USING 4 KEY MODELS*

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**Abstract**

This work assesses the effects of the capital and liquidity requirements of Basel III have on banks book value employing an empirical assessment of univariate as well as a multivariate analysis as a way to examine the abnormal returns as well as its impact on banks by way of the size, capital and liquidity position.

**Keywords:** Basel, Bank, liquidity and capital

## Overview

According to the works [1], there is a long-established link between Management theory and practice has been realized in as part of the assessment between effective performance measures as well as that of effective management. Its level of effectiveness regarding performance measure is dependent on its usefulness. It is indeed useful to conduct performance approaches to have meaning, as a way to provide useful information and or data making it necessary in terms of comparisons. There is however need for comparison as it may assess the progress level by way of achieving set targets, assessing performance trends overtime and or assess the performance of a company against the other as per the works of [2], it is in view of this that we try to do an assessment of the effects the Basel III regulations tend to have on the book value of the respective banks.

We then do our assessment by using several models and or assessments not limited to;

1. Employing the Benchmark model,
2. Computing and evaluating abnormal returns
3. Undertaking a univariate Analyses
4. Undertaking a multivariate Analysis

## Methodology

### Employing the Benchmark model

A key parameter is the benchmark model; this however helps in assessing abnormal returns of banks. We start off with the abnormal returns of bank ( *j)* employing (t ($AR_{it}$) as time we then realize the actual return of bank (*j*) employed at time *t* ($R_{it}$) less normal return of bank *j* employed at time *t* ($NR_{it}$) so we then arrive at the formular below

$$AR_{it} = R_{it} - NR_{it}$$

In the works of [3] four different methods are employed in determining the normal returns, the employed models are not limited to:

– the model which employs the mean-adjusted returns,

– the model which considers the market adjusted returns,
– the model of market residuals (or market model) and
– the model of capital asset pricing commonly known as CAPM.

The works of [4] also goes on to approve these four models as the most frequent employed models in demonstrating normal returns. It is important to note that these models differ one way or the other with regards to the employed benchmark return model as well as its interval. The mean adjusted return model on the other hand does not take into account the market wide stock price movements from the benchmark. Regarding the market adjusted returns model each stocks "beta" must be equal to one. We can realize on the other hand that the market model as well as the CAPM however takes into account the market wide stock price movements from the benchmark return with different values for "beta".

We however employ the market model in determining the normal returns, since the market model is readily available and there is more suitable the information in its application in comparison to the CAPM. We can then put up the market model in defining the normal returns as below:

$$NR_{it} = \hat{\alpha}_{\mathrm{i}} + \beta(\mathrm{R}_{\mathrm{mt}})$$

The parameters $\hat{\alpha}$ and $\hat{\beta}$ are considered as the OLS estimates of the regression coefficients, whilst the market return ($R_{mt}$) is set by employing the FTSE Eurotop100 index at day $t$. it is noteworthy that the normal returns entail the assessment of some factors. The assessment of the factors are realized over an estimated period, i.e. [$T1$, $T2$], which go before the period of the event [$t_1$, $t_2$]. The introduction of the Basel III norms is shown as $t = 0$. The period of the estimation run for 167 trading days which end fifteen days in advance of event date. The interval of the estimation window is established on the works of [5] as well of that of [6]. They both employed an estimation window between 100-300 days.

**Computing and evaluating abnormal returns**

We then compute and evaluate the abnormal returns at period *t*. analysing an organization returns data separately is not very relevant as changes in the price of stock may be caused information which is not be related to the event assesses. In determining the average information on a number of firms improves the accuracy of the analyses. We however determine the cross-sectional average of abnormal returns employing period *t* is considered as:

$$AAR_T = \frac{1}{N}\sum_{i=1}^{N} AR_{it}$$

We then realize a wide deviation regarding the average abnormal returns (AAR) from zero and as such deviation designates abnormal performance. The abnormal return is centred on one particular occurrence, thus the average however reflects the effect of the particular event as indicated in the works of [3]. We however strike out all data and or information not related to the event on average.

We however use the cumulative abnormal return (CAR) method in determining the performance over a period. The CAR method however aggregates the abnormal returns from the beginning of the period ($t_1$) to the end of the period ($t_2$):

$$\mathrm{CAR_i} = \mathrm{AR}_{i,t_1} + .. + \mathrm{AR}_{i,t_2} \sum_{t=t_1}^{t_2} AR_{it}$$

We then calculate the CAR for windows [0], [0,3], [-1, +1], [-3, +3] and that [-5, +5].

To determine the average CARs over the cross-section of events we then estimate the cumulative average abnormal returns (CAAR). We then realize the equation of the CAAR as:

$$CAAR = \frac{1}{N}\sum_{i=1}^{N} CAR_i$$

We also employ the t-tests in assessing the level of significance of the CARs we realize then that the CAR is significantly different from zero at a certain significance level this thus confirms the work of [7].

It is worthy to note that the expected cumulative price thus changes over period [$t_1$,$t_2$] resulting zero:

i.e. $(CAR_{it}) = 0$

We then assess by employing the formula below;

$$t\ test = \left(\frac{1}{\sqrt{N}}\right) * \left(\frac{CAR}{SD(AR)}\right)$$

In the equation the parameters SD *(AR)* is the standard deviation of the abnormal returns regarding the event window.

**Undertaking a univariate Analyses**

We also undertake the univariate as well as the multivariate analysis in determining the possibility of a variation of stock price reactions of banks sizes be it small-, medium- or large regarding the introduction of Basel III requirements. Our first analysis regarding univariates does a computation to compare the mean of the abnormal returns amongst bank sizes be it large, medium and or small and as such indicates which bank size exhibits a stronger result on its returns by virtue of the introduction of Basel III requirements. The second and third univariate analysis on the other hand however compares the CARs of banks which are high- as well as low in terms of its capitalization and liquidity.

**Undertaking a multivariate Analysis**

When we employed the univariate analysis, we took into accounts only one variable. We then test if other omitted variables differ systematically with the selected variable in our univariate analysis; in doing so we then employ a multivariate regression analysis. The multivariate analysis assesses the resilience of the effects and its explanatory power of the market response. Our regression model for the multivariate analysis is however shown below:

$$CAR_{i,(t-n,t+n)} = \alpha + \beta_1 MEDIUM + \beta_2 LARGE + \beta_3 \frac{C+S}{TD} + \beta_4 CRAR + \beta_5 \frac{CE}{TA} + \beta_6 ROE + \beta_7 MTBR + \varepsilon$$

We realize from the formulae that CAR is the dependent variable in the model where as the control variables be made up of variables that are related to the financial characteristics of a bank and two dummy variables; these dummy variables represent the size of the firm. One dummy variable denotes the medium-size banks (i.e. $MEDIUM$ in the regression model) and the other dummy variable represents the large-size banks (i.e. $LARGE$ in the equation). We then have α as the intercept in the regression model and that captures the impact of small banks. In determining the level of higher liquidity of a bank in terms of if its assets react less negatively to the new capital and liquidity requirements, cash as well as its securities to total deposits $\left(\frac{C+S}{TD}\right)$ is however employed as a substitute of liquidity. Cash is however considered as the most liquid asset as per the works of [8].

We measure the Capital to Risk Weighted Assets Ratio (CRAR) measured as an effect of both Tier 1 and Tier 2 capital requirements to the risk weighted assets (RWA).

**Conclusion**

We can conclude that CRAR ascertains if banks having high capital ratios realizes less or no negative impact by way of the new capital requirements on its balance sheet as well as its overall performance; on the other hand, the Common Equity to Total Assets) $\left(\frac{CE}{TA}\right)$ also helps in measuring the leverage ratio; which as a proxy however examines whether banks with higher leverage ratios are resilient or insolvent by the Basel III requirements. The variable Return on Equity (ROE) is also employed to serve as a control for a dependency between the bank's cumulative abnormal returns notwithstanding the profitability of the bank. The ROE is principally vital to investors and or shareholders and is connected to the book value of a bank. It is however undeniable to note that the Market-to-Book Ratio (MTBR) could be considered a control variable and as such we can further determine its value. It is also a

growth determinant. [9] in their work indicates that firms which hold higher market-to-book ratios are seen on average as more profitable in comparison to banks with lower Market –to- book values

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