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# Effect of Interest Rates on Banks Profitability: The Case of GCB Bank PLC

**Elizabeth Sarfo-Kantanka[1], Oscar Opoku Agyemang[2*], Isaac Opoku Dadzie[3], Verosivera Boateng[4], Owusu-Debrah Mark[5]**

*[1]MBA (Finance), University of Cape Coast, Ghana*
*[2*]PhD (Candidate) Geography, University of Cape Coast, Ghana*
*[3]University of Professional Studies*
*[4]University of Cape Coast, Ghana*
*[5]Koforidua Technical University, Ghana*

*Corresponding Email :[2]*oscarthesis@gmail.com*

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***Abstract:*** ***The study was to examine the impact of change of interest rate on banks profitability. Specifically, it sought to identify the relationship between the change of interest rate and banks profitability for the period 2008-2019; and to determine the effect of change of interest rate on banks profitability for the period 2008-2019. The study was an explanatory research design of quantitative approach that extracted data from the Annual Financial Reports of GCB Bank Plc on Return on Assets (ROA), Return on Equity (ROE) and Bank Size of GCB, and the Monetory Interest Rates by the Bank of Ghana from 2008 to 2019. Both descriptive statistics such as freqauencies, means and standard deviation as well as inferencial statistics such as multiple regression were used in the data analysis. Overall, this study concluded that the Change of Interest Rate (CIR) have significant effect on Banks Return on Assets (ROA) and Return on Equity (ROE), and by extension affective banks profitability. It was established that yearly interest rates of Ghana, as reported by the BoG on monthly basis have seen some fluctuation over the last 12 years. The highest positive change in percentage of 23.21 was recorded in 2015, whereas 2018 recorded the highest negative change of -20.22, and 2012 recorded no change change. Also, there was significant relationships between the Change of Interest Rate (CIR) and Banks Profitability, specifically Return on Assets (ROA), Return on Equity (ROE) and Bank Size.***

***Keywords:*** ***Return on Assets, Return on Equity, Interest Rate, GCB Bank PLC, Profitability.***

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## 1. INTRODUCTION

The banking sector is one of the largest segments of any country's economy that contributes to any country's economic growth and development. Amna (2016) says that the world wants a stable microenvironment, which is a prerequisite for a country to have a stable banking sector. In order to make financial services available to economic actors, the banks are primarily responsible for financial intermediation (Hassan, Olanrewaju & Makinde, 2016). Banks are moved to deficit sectors by depositing them and turning them into lending activities, such as excess businesses or economic units (Clark, 2017, Okoro, Chris, Amujiri, & Okeke, 2018; Hasan, Kareem & Khalil, 2020; Ivo, Mike & Camenus, 2020). The extent to which this can be accomplished depends on interest rates and the degree of economic growth and on saving habits of the country (Olanrewaju & Makinde, 2016).

Profitability is now a key element for banking sector expansion and growth which needs to concentrate on bank profitability issues (Menicucci & Paolucci, 2016; Jreisat, 2020). Return on investment depends on the quality of their asset and liability of the portfolio (Amna, 2016). Interest rate is a fee for borrowing money that is the amount paid for borrowing money and earning it while spending money (Ogundipe, Akintola & Olaoye, 2020; Mimouni, 2017). Interest on the stock market is regarded as a very phenomenal factor. The global financial markets have contributed to greater uncertainty in the global economy in today's sector of relaxation (Muhammad, Shehzad, Khan & Faisal, 2014). However, the profitability of the financial industry is increasing and there is an increase in interest rates, with the high cash reserves attributed to the client balance and business operation of banking institutions, including banks, commercial banks, investment firms, assurers and courier companies (Investopedia, 2017; Sujud & Hashem, 2017). The overall economic activity, goods and services flow, and financial assets within the economy are also affected by the interest rate (Luo, Li, Peng & Fan, 2018; Ufoeze, Odimgbe, Ezeabalisi, & Alajekwu, 2018; Saunders, 1999). Government actually manipulating monetary policy through the central bank to achieve stability, with the most important determining factors of interest rates such as expected inflation, government borrowing and banking sector efficiency (Ufoeze et al., Odimgbe, Ezeabalisi & Alajekwu, 2018; Hall & Reis, 2016; Claeys, Demertzis & Efstathiou, 2018).

Bank profits typically grow with rising interest rates, according to Samuelson (1945), who also reported to Khawaja and Musleh (2007) that the rise in interest rates depresses borrowers and depositors, such as investment and savings. Banks earn high returns from borrowers by charging high interest rates and deterring depositors by giving them low returns, resulting in inclusive spreads. In addition, Muhammad and Shehzad (2014) concluded that, in order to quantify the influence of changes in the profitability of the bank, it is important to analyse and determine the aggregate volatility in interest rates in the economy and to present the effects of interest rates on cash flow, so that the adjustment in interest rates will either have a positive or negative impact on the profitability of the bank.

Furthermore, according to Owusu-Antwi, Banerjee and Antwi (2017), for about the past 12 years, Ghanaian Banks have experienced around 45% of total revenues which is coming from

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interest income. With this it can be said that interest rate risk is a major source of risk to which commercial banks are exposed. In other words, interest rate rises would affect a bank's profitability by increasing its financing costs, lowering returns on investment and reducing equity valuation (Bawumia, Belnye & Ofori, 2005). The principal concern of the lender, therefore, is the earnings, expense and profitability impact of commercial banks. According to Mbutor (2010) in a situation where the financial system is not well-developed, inefficient and uncompetitive, banks' lending rates could be artificially high and low deposit rates, with borrowers and savers reducing essentially to price takers in the markets. In this situation, the market must consider rates emerging from a non-competitive and dysfunctional bank environment that has left lending rates of the banks hesitantly elevated in Ghana, even though the benchmark price has recently been reduced (Bawumia, Belnye & Ofori, 2005).

Besides that, high interest rates limit investment prospects, thus reducing not only industrial growth, but also economic growth, and impacting the bank's earnings. Ideally, Ghana's comparatively high rate of interest and high credit expenditures would make it less attractive for deposits and hamper the bank's profitability (Kwakye, 2010; Akowuah, 2011; Ayensu, Gbemu, Kuma & Appiah, 2016). According to Amuakwa-Mensah and Marbuah (2015), high credit costs are among the key issues listed by investors as impeding businesses in Ghana. Ghana will draw higher investment, contributing many marks to its growth rate, if interest rates and credit costs are lowered drastically.

High interest rates thus result in high prices of goods and services to be charged by customers through a rise in credit and production costs. The country has continued to worry about the highest level of interest rate in Ghana. Although historically and in the recent past, some measure of macroeconomic stability was achieved, interest rates were generally high (Bawumia, Belnye & Ofori, 2005).

**Statement of Problem**

The interest rates of the commercial banks in Ghana, which have been used as an instrument to control inflation levels, have in recent times become a very sensitive factor in managing foreign exchange rates to acquire economic stability. The trade banks were obliged to deal with periods of high interest rate, according to Nyapara and Everlyne (2012), that affected banks differently as the effect on the changes in interest rates reacted in different ways by the different banks. These changes lead to consumers reducing their borrowings or keeping them from expecting interest rates to fall in the long term. Consequently, the notion that commercial banks "lend long and borrow short" implies that bank profit may decrease in case of an increase in short-term interest rate and a decrease in long-term interest rate which on the other hand, the bank will benefit from a decrease in short-term interest rate and an increase in long-term interest rate (Vong & Hoi Si Chan, 2008). Therefore, they expect that real interest rate is expected to have a positive relationship with profitability in the essence of lend-long and borrow-short argument. Provided that markets are efficient, the researcher expect negative effects of short-term interest rates on bank profitability while, we assume that positive impacts of long-term interest rate changes on bank profitability. According to Owusu-Antwi et al. (2017), during the past years, several studies have analysed the effects of fluctuations/ changes of interest rates on the banks profitability in

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the U.S and most studies find that bank returns exhibit a negative correlation with the changes of interest rates, while others find no significant association between the movements of the interest rates of the commercial banks. Furthermore, research undertaken by Muhammad, Shehzad, Khan and Faisal (2014) in order to determine the overall effects of the interest rates on profitability of the commercial bank by applying regression techniques has shown that rates of ROA and ROE for banking institutions have an additional impact. Ultimately the aim was to relate the exchange rate changes with the profitability of commercial banks in Kenya according to Nyapara and Everlyne (2012). The research found that the correlation between interest rate changes and banking profitability is generally positive. The rise in interest rates would also lead to an increase in bank earnings as a result of banks' commitment to diversify their products and take into consideration their shifting operating climate and the opportunity to benefit from the capital generated by higher interest rates due to high-revenue acquisitions and fund diversification. Therefore, this study shows that while certain banks' profit level has reduced, they have done things to ensure that interest rate rises do not impact them too badly. As a result, several studies have been carried out to determine the impact of interest rates on the profitability and economic development of banks in Ghana (Adu, Marguah & Mensah, 2013; Brock & Franken, 2002; Demirguc-Kunt & Huizinga, 1998; Owusu-Antwi et al., 2017; Musah & Anokye, 2018), but little research has been conducted on changes in interest rates on the profitability of banks. Therefore, on the basis of the above issue, the study sought to examine the impact of interest rate changes on the profitability of banks using the GCB Bank Plc as case study.

## 2. RESEARCH METHODS

An explanatory research design of the quantitative approach was adopted for the study. The study used secondary which involved the data that were extracted from the annual financial information of GCB bank Plc, as well as the monthly interest rates as reported by the Bank of Ghana from 2008 to 2019.

### Model Specification

$$Y = \beta_0 + \beta_1 K + \mu \quad (1)$$

Where, "Y is the dependent variable. $\beta_0$ is constant, $\beta_1$ is the coefficient of explanatory variable, K is the explanatory variable and $\mu_{it}$ is the error term assumed to have zero mean and independent across time period". ROA is Return On Asset, ROE is Return On Equity, and CIR is change in Interest Rate. Equation 2 and 3 emerges by adopting the economic model (panel data) explicitly for this analysis, as in the equation 1.

$$ROA = \beta_0 + \beta_1 BS_{it} + \beta_2 INF_{it} + \beta_3 CIR_{it} + \mu \quad \text{Equation 2}$$

$$ROE_{it} = \beta_0 + \beta_1 BS + \beta_2 INF + \beta_3 CIR + \mu \quad \text{Equation 3}$$

### Dependent Variable

Return on Asset and Return on Equity were the dependent variables that wee extracted from the annual report of the GCB bank Plc from 2008-2019.

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**Independent Variable**

**Change of Interest rate**: In a simple term as cost of borrowing. In this research, the Monthly Interest Rates as reported by the Bank of Ghana from 2008 to 2019 was used for the analysis. However, bank size was used as a control variable.

**Data Processing and Analysis**

Researchers edit, code and test the information collected. The data is processed. The next step is the table of the result after editing. The primary data here are listed and tabulated in statistical tables by synthesising the quantitative data. The data will be evaluated after the table is drawn. Stata and Microsoft Excel are key platforms used for complete data processing to include inferential analysis. The Stata is a robust data processing framework. In order to assess the relationship between interest rates and profitability, regression analysis was conducted.

## 3. RESULTS AND DISCUSSION

**Descriptive Statistics**

The descriptive statistics for the variables used in this research are listed in this section of the data analysis. This study contains descriptive bank interest rate statistics from 2008 to 2019, bank rate changes (2008-2019) and a summary of the contingent and independent variable statistics used in the analysis. The findings are seen in Table 1, Table 2 and Table 3 subsequently.

Table 1: Descriptive Statistics of Bank Interest Rates from 2008 to 2019

| Year | N | Mean | Std.Dev | Min | Max |
|---|---|---|---|---|---|
| 2008 | 12 | 15.79 | 0 | 16 | 1 |
| 2009 | 12 | 18.29 | 1.14 | 17 | 20 |
| 2010 | 12 | 14.67 | 1.92 | 20 | 25.5 |
| 2011 | 12 | 12.92 | 0.19 | 25.5 | 26 |
| 2012 | 12 | 12.92 | 2.04 | 21 | 26 |
| 2013 | 12 | 15.67 | 1.37 | 16 | 21 |
| 2014 | 12 | 18.67 | 0.49 | 15 | 16 |
| 2015 | 12 | 23.00 | 0.84 | 12.5 | 15 |
| 2016 | 12 | 25.92 | 0.47 | 12.5 | 13.5 |

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| | | | | | |
|---|---|---|---|---|---|
| 2017 | 12 | 22.25 | 1.45 | 13.5 | 18 |
| 2018 | 12 | 17.75 | 0.45 | 17 | 18.5 |
| 2019 | 12 | 16.00 | 1.48 | 13.5 | 17 |

Table 1 presents the yearly distributions of interest rates as announced by the Bank of Ghana on monthly bases, from 2008 to 2019. From the above table, the highest interested rate was recorded in 2016 and the lowest was reported in 2011, while 2012 did not see any improvement. Nevertheless the percentage changes for the above this distribution is presented in the Table 2.

Table 2: The Changes of Bank Interest Rates (2008-2019)

| Years | Interest Rates | Change in Interest Rate | Change in Interest Rate(%) |
|---|---|---|---|
| 2008 | 15.79 | - | - |
| 2009 | 18.29 | 0.158 | 15.83 |
| 2010 | 14.67 | -0.198 | -19.82 |
| 2011 | 12.92 | -0.119 | -11.93 |
| 2012 | 12.92 | 0.000 | 0.00 |
| 2013 | 15.67 | 0.213 | 21.29 |
| 2014 | 18.67 | 0.191 | 19.15 |
| 2015 | 23.00 | 0.232 | 23.21 |
| 2016 | 25.92 | 0.127 | 12.68 |
| 2017 | 22.25 | -0.141 | -14.15 |
| 2018 | 17.75 | -0.202 | -20.22 |
| 2019 | 16.00 | -0.099 | 16.00 |

Table 2 display the percentage changes in bank interest rate over the study period. The Table's findings indicate that there have been major positive and negative changes in interest rates over the last 12 years. The highest positive percentage change in 2015 was 23.21, while the most negative change in 2018 was -20.22. Yet 2012 saw a shift of 0 percent.

**Descriptive Statistics for Dependent and Independent Variables**

In this segment of the data analysis are described the descriptive statistics of variables used in this report. This study contains descriptive bank interest rate statistics from 2008 to 2019, bank rate changes (2008-2019) and a summary of the contingent and independent variable statistics used in the analysis. The findings are seen in Table 3.

Table 3: Summary Statistics for Dependent and Independent Variables

| **Variables** | **Obs** | **Mean** | **Std. Dev** | **Min** | **Max** |
|---|---|---|---|---|---|
| CIR | 11 | 1.471315 | 17.28585 | -20.22472 | 23.21429 |
| ROA | 12 | .035587 | .0199423 | .0067967 | .0659102 |

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| | | | | | |
|---|---|---|---|---|---|
| ROE | 12 | 26.19167 | 14.02974 | 9.1 | 50.00 |
| Bank Size | 12 | 3.02e+08 | 6.94e+08 | 2076361 | 1.92e+09 |

*Note: CIR = Change of interest Rates, ROA = Return on Assets, ROE = Returns on Equity.
*Bank Size is in Ghana Cedis
*ROA and ROE are in percentage

From Table 3, Change of Interest Rate had 11 observation instead of 12, thus from 2009 to 2019. The reason is indicative to the nature of the formula for calculating the Change of Interest Rate ($\frac{x2-x1}{x1}\ X100$), as such the value for the first year (2008) was not possible to have been calculated since the values for 2007 is not readily known to the researcher (Table 3). However, the mean score of the Change of Interest Rate for the periods understudy (2008-2019) is 1.47, at the standard deviation of 17.29, the minimum change in a year is -20.22, whereas the maximum change a year is 23.21. Also, from the same Table 3, ROA had 12 observation, thus from 2008 to 2019. The total mean score for the whole periods of study observation is 0.04% with a standard deviation of 0.0199. The minimum ROA for GCB Bank Plc in a year is 0.007%, whereas the maximum ROA for GCB Bank Plc is 0.066%, suggesting that there has not been much fluctuations in the yearly ROA of GCB Bank Plc over the years under study. Furthermore, from the Table 3, ROE had 12 observations, the total mean score for the whole periods of study observation is 26.19% at a standard deviation of 14.03. The minimum ROE for GCB Bank Plc in a year is 9.10%, whereas the maximum ROA for GCB Bank Plc is 50.00%, suggesting that unlike ROA, the year on year ROE of GCB Bank Plc has seen significant variations or fluctuations over the last 12 years, or the years under observation. Again, Bank Size similarly had 12 observations, thus from 2008 to 2019. The total mean score for the entire periods of study observation is GHs302.000,000.00. The least Bank Size of GCB Bank Plc in a year is GHs 2,076,361.00, whereas the maximum Bank Size in a year is GHs1.920,000,000.00 signifying the year on years Bank Size of GCB Bank Plc that seen much fluctuations over the years under study.

**The Relationship Between the Change of Interest Rate and Banks' Profitability**
The study explains the correlation of interest rate change (CIR) with the profitability of the bank, in particular the return on assets (ROA), equity return (ROE) and the scale of the Bank. Table 4 displays the association matrix results of variables.

Table 4 Correlation Matrix of Dependent and Independent Variables

| Variables | | CIR | ROA | ROE | Bank Size |
|---|---|---|---|---|---|
| | CIR | 1 | | | |
| | ROA | 0.6306* | 1 | | |
| | ROE | 0.4905 ** | 0.8774 | 1 | |
| | Bank Size | 0.2734 * | -0.4439* | -0.4107* | 1 |

*Note: CIR = Change of interest Rates, ROA = Return on Assets, ROE = Returns on Equity.

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Table 4 shows the relationship between CIR and the other explanatory variables. Firstly, this study found a high positive correlation between the CIR and the ROA of GCB Bank Plc. This is shown with the correlation coefficient of 0.631 at a significant value of $P \leq 0.05$. This positive relationship is an indication that a positive change of interest rates leads to a positive change in the return on assets of GCB, whereas a negative change of interest rates results in a negative change in the return on assets of GCB. The findings from the Table 4 also show a positive but modest association between the shift in interest rates and the ROE of GCB Bank Plc. This is demonstrated by a correlation coefficient of 0.491 at a meaningful $P \leq 0.01$. This moderate association between the rise in interest rates and the ROE of GCB Bank Plc suggests that a change in the change in interest rates results in a slight change in the ROE of GCB Bank Plc. Finally, in Table 4, there was a favourable but weak association between the shift in interest rates and the size of the GCB Bank Plc. This is demonstrated by a correlation coefficient of 0.273 at a meaningful $P \leq 0.05$. Overall, Table 4 indicates the positive association between the change in interest rate and the profitability of banks (ROA, ROE, and bank size). It means that if the interest rate increases/decreases, the profitability of the banks will also increase/decrease in the same way. This result is consistent with the results of Khan and Sattar (2014) and Borio, Gambacorta and Hofmann (2017), who, in a series of experiments, found a positive association between the change in interest rate and the profitability of banks, and also contradicts the findings of Ahmed (2018) who, in comparison, found a negative change in the interest rate relationship and the profitability of banks.
Therefore, the Null Hypothesis that $H_0$: There is negative relationship between the change of interest rate and banks profitability (return on assets, return on equity, and bank size) is rejected.

**The Effect of Change of Interest Rate on Banks Profitability for the Period 2008-2019.**
This section of the study describes the effect of CIR on Banks Profitability, specifically ROA, ROE and Bank Size. Table 5 captures the results of the linear regression analysis between CIR on Banks Profitability (ROA, ROE and Bank Size).

Table 5: The Effects of Change of Interest Rate (CIR) on Banks Profitability

| **Return on Assets (ROA)** | | |
|---|---|---|
| Change of Interest Rate (CIR) | Multiple R | 0.017465 |
| | R Square | 0.4976 |
| | Adjusted R Square | 0.3307 |
| | Standard Error | 0.013063 |
| | Prob > F | 0.0375 |
| | F (1, 9) | 5.94 |
| | Root MSE | 0.01674 |
| | Observations | 11 |
| **Return on Equity** | | |
| Change of Interest Rate (CIR) | Multiple R | 0.4107373 |
| | R Square | 0.4406 |

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| | | |
|---|---|---|
| | Adjusted R Square | 0.1562 |
| | Standard Error | 0.2432643 |
| | Prob > F | 0.002 |
| | F (1, 9) | 2.85 |
| | Root MSE | 13.297 |
| | Observations | 11 |
| **Bank Size** | | |
| Change of Interest Rate (CIR) | Multiple R | 9115544 |
| | R Square | 0.0748 |
| | Adjusted R Square | -0.0280 |
| | Standard Error | 1.07e+07 |
| | Prob > F | 0.4159 |
| | F (1, 9) | 0.73 |
| | Root MSE | 5.8e+08 |
| | Observations | 11 |

*****Notes: Change of Interest Rate (CIR) is the independent variable.

Table 5 describes the exact performance of the Linear Regression Analysis between the CIR on Bank Profitability (ROA, ROE and Bank Size) in three sperate models. The first model estimated the effect of the CIR on ROA of GCB, the second model estimated the effect of the CIR on ROE of GCB and third model predicted the estimate effect of CIR on the Bank size of GCB, for the period 2008 to 2019 each. There were important P values of 0.05 for the first and second models and 0.01 for P for the second, except for the third model (Bank Size) of > 0.05 for each. The denoted regression coefficient is "Multiple R" in Table 5. It illustrates how the average of the dependent variable is modified due to an independent variable shift in a single unit and the model consists of other variables. R squared ($r^2$) is the determination coefficient; it specifies the number of points which match in the regression best. The "Standard Error" calculates the standard error deviation estimate μ which demonstrates accuracy in measuring the regression coefficient. In this case, 11 observations are seen in the "Observation" 11. Table 5 shows the effects of CIR on the GCB ROA, with a coefficient (r) score of 0.017465, which showed a positive but weak effect of CIR on the GCB ROA. The R-squared which is an indication of the overall goodness of fit of the model show that about 50 percent changes in the dependent variable are caused by the independent variables. The F-statistic also shows an overall significance of the model used meaning the model is appropriately fitted. This explains that the CIR variables are very important in explaining the ROA of GCB. As manifested from the Table 5, the results show that on average, a 1% increase in the CIR results in a 0.02% increase in ROA of GCB and this is significant at $P \leq 0.05$ level of significance. This indicates that a higher increase in the CIR translates into a marginal increase in ROA of GCB. Also, from the second model of Table 5, a 1% increase in

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CIR results into an increase in ROE of GCB by 0.41%, and this is significant at 10% level of significance. Nevertheless, the third model had at significant level of recoded P > 0.05, making the outcome of the model statistically insignificant.
The overall effect of the results in Table 5 is that the CIR do have marginal effects on the Profitability of GCB, on the banks' ROA, as well as ROE. This further concurs with the findings of Khan and Sattar (2014) who similarly found CIR to have significant effect on Banks ROA and ROE. Therefore, the Null Hypothesis that $H_0$: There is negative effect of change of interest rate on banks profitability (return on assets, return on equity, and bank size) is rejected.

**Conclusion and Recommendations**
The study examined the effect of change of interest rate on banks profitability. An explanatory design was employed and followed appropriately and the following conclusions can be drawn out of the research findings of the study. There was a positive relationship between the Change of Interest Rate (CIR) and Banks Profitability, specifically Return on Assets (ROA), Return on Equity (ROE) and Bank Size. Also, CIR contributes positively to ROA of GCB Bank Plc. Similarly, CIR also contributes positively to ROE of GCB Bank Plc. Based on the research results, the following suggestions are made and the findings drawn. Ghana Commercial Bank and other banks can focus on profitability by charging the lower interest rate and ensuring good returns for depositors to enhance economic sustainability. Money participation is not required to reduce bank risk. Their emphasis on non-interest sales should be limited to a minimum. The State Bank of Ghana should play an important role in controlling the spread of interest. The Bank has to take conscious action on the unforeseen difference in the cost and capital adequacy.

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