

# **The Research of the IRB Transition Impact on Greek Banks Value**

Merikas A., Merika A., Henry I. Penikas, Mikhail A. Surkov

## **ABSTRACT**

In our research we were trying to estimate the effect of IRB implementation on Greek banks. Based on the difference-in-difference method the authors estimated the result of IRB transition on banks' stock prices. The first part of the article is based on the table analysis of share prices. As we have limited sample of only five listed banks, the authors decided to compare not only IRB banks and Non-IRB banks, but the IRB banks which have implemented IRB, and which have not. This change allows to increase the number of observations and make the research more complete. The key findings of the research are as follows: the IRB implementation leads to lesser fall in banking share prices.

**Keywords:** Banking performance, difference-in-difference, Greek banks, IRB, Internal Rating based approach

**JEL codes:** G10, G20, G21.

In recent decades the banking regulator, the Basel Committee on Banking Supervision (BCBS), had introduced new standards of controlling banking activity. The Basel II represents the regulator response to the crises which occurred in Asia and Russia during 1997-1998. One of the points of the new requirements was the implementation of a more complex approach to the risk valuation. The banks were allowed to use three different approaches to calculate their credit risk:

- 1) Standardized approach;
- 2) Foundation internal ratings-based approach, FIRB;
- 3) Advanced internal ratings-based approach, AIRB.

So, from 2008 some banks started to implement new requirements. However, there is one question needed to be answered: did IRB transition effect on banks' performance? In our research we would try to answer this question.

In some articles, the problem of the IRB effect was raised. The controversial impact of IRB on banks is mentioned in (Montes, Artigas, Cristófoli, & San Segundo, 2016), (Cummings & Durrani, 2016). The researches were conducted on real data taken from two regions of Europe and Australia. (Montes, Artigas, Cristófoli, & San Segundo, 2016) indicated that banks with larger amounts of capital, having a relatively high probability of default, rarely preferred to use the method of internal approaches. At the same time, those banks that had the highest indicator of the total value of assets more often used IRB. The authors also concluded that in the case of the implementation of IRB, the central banks should have paid more attention to monitoring compliance with financial institutions standards of capital adequacy. In turn, (Cummings & Durrani, 2016) concluded that IRB-banks use a smaller amount of reserves for loan portfolios. The authors also noted that IRB-banks did not consider the likelihood of a more unfavorable outcome.

Another work that examines the effect of IRB on the banking system is (Fouche, Mukuddem-Petersen, Petersen, & Senosi, 2008). This study showed that the approach for calculating the IRB leads to procyclicality, which in conditions of crisis will lead to its aggravation.

However, we did not find articles which are represented the analysis of the effect of IRB transition on banking value, so we decided to make a research trying find the answer for this problem.

First, we found the country, which has both IRB and Non-IRB banks. Moreover, the banks' stocks should be listed on the local exchange. Also, the type of the financial system should be in common with developing countries. According to these criteria we choose Greek banks as analyzing data set.

As for November 2018 we have found 5 commercial banks which are listed on Athens exchange. They are:

- 1) Alpha Bank;
- 2) Attica Bank;
- 3) EuroBank Ergasias;
- 4) National Bank of Greece;
- 5) Piraeus Bank.

Four of them use IRB approach for credit risk valuation:

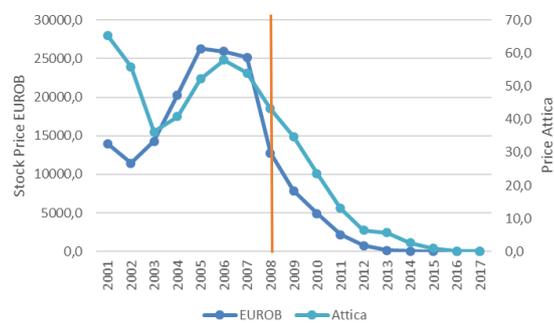
- 1) Alpha Bank;
- 2) EuroBank Ergasias;
- 3) National Bank of Greece;
- 4) Piraeus Bank.

In our analysis we would compare banks' performance using the change of share prices. To find the IRB implementation effect we would use Difference-in-Difference method. According to it our data should be divide into two groups [treatment (IRB-banks) and control (non-IRB banks)] and two time periods (before IRB implementation and after). However, we faced a problem, because we did not have enough data for control groups. So, we decided to identify IRB banks as control group at the time, until they do not implicate IRB approach.

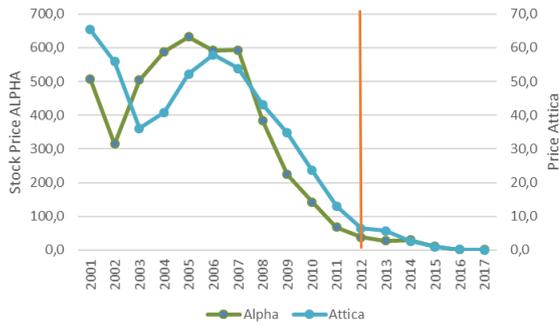
The first part of our research was based on graphical analysis. We decided to compare the change of IRB share prices and non-IRB. As the one can see from the Figure 1 there is a drop of the share price for both IRB and non-IRB banks. But nevertheless, the fall of banks after the shift to IRB is less, than the time before the IRB.



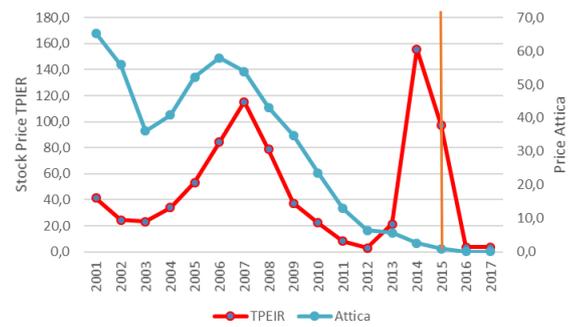
(a)



(b)



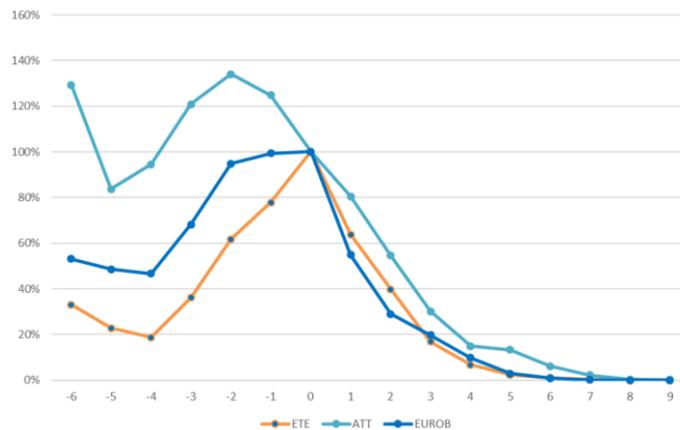
(c)



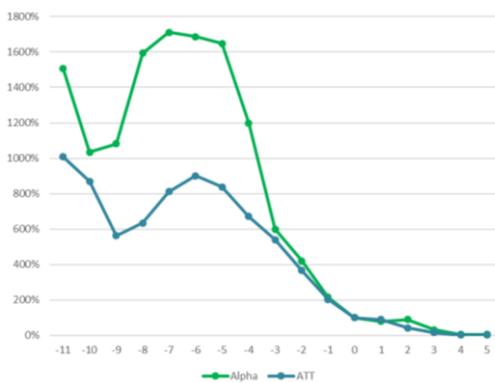
(d)

Figure 1, the change of IRB banks stock prices is less significant comparing to the non-IRB bank

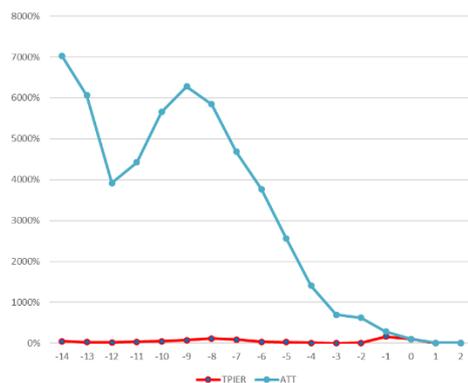
The Figure 2 represents the percentage price change from the time of IRB transition. This figure confirms the conclusions from the previous graph. The one can see that there is a significant drop of relative price, before t0 (time of IRB implementation).



(a)



(b)



(c)

Figure 2, the percentage change of banks prices represents the less significant drop after shift to IRB

The second part of our research was the table analysis of diff-in-diff method. The one can see from the Table 1 we calculated the mean values for treatment group in two periods. And did the same for control variables. The results of this calculations are presented in the Table 2. The diff-in-diff value is above 0. It means that the IRB banks have higher share prices.

Table 1, the method of Diff-in-Diff calculations

	Treatment	Control	Diff
Before	$Y_{i0}   T$	$Y_{i0}   C$	
After	$Y_{i1}   T$	$Y_{i0}   C$	
Diff	$\bar{Y}_1   T - \bar{Y}_0   T$	$\bar{Y}_1   C - \bar{Y}_0   C$	$(\bar{Y}_1   T - \bar{Y}_0   T) - (\bar{Y}_1   C - \bar{Y}_0   C)$

Table 2, there is a positive connection between bank performance and IRB approach

	Treatment	Control	Diff
Before	8823,57	7176,56	
After	2500,04	42,58	
Diff	-6323,53	-7133,98	810,45

The further research would base on the regression analysis. The equation is presented below:

$$Y_{it} = \beta_0 + \beta_1 treatment_i + \beta_2 time_t + \beta_3 time_i * treatment_i + \sum_{k=1}^K \gamma_k z_{ki} + u_{it},$$

$i$  – bank,

$t$  – yera,

$k$  – number of control variables,

$Y_{it}$  = price of banks' shares,

$$treatment_i = \begin{cases} 1, & IRB - Bank \\ 0, & else \end{cases},$$

$$time_i = \begin{cases} 1, & year of IRB implimentatin \\ 0, & else \end{cases},$$

To understand the effect of IRB on banking performance we will describe coefficient  $\beta_3$  (Вулдридж, 2009). If it is significant and positive, then the one can say that there is a connection between IRB approach and bank performance.

The final part of the work will depend on describing the effect of IRB according to some bank indicators, as probability of default (PD), exposure at default (EAD), positions of balance sheet and profit/loss statement (Abdul, 2017), (Ehalaiye, Tippett, & Zijil, 2017).

In the end of this research we expect that there will be a positive connection between IRB implementation and banking performance.

## References

Abdul, M. J. (2017). Impact of Capital Adequacy on the Performance of Nigerian Banks using the Basel Accord Framework. *East Africa Research Papers in Business*,

Cummings, J., & Durrani, K. (2016). Effect of the Basel Accord capital requirements on the loan-loss provisioning practices of Australian banks. *Journal of Banking & Finance*, 67, 23-36.  
doi:10.1016/j.jbankfin.2016.02.009

Ehalaiye, D., Tippett, M., & Zijil, T. (2017). The predictive value of bank fair values. *Pacific-Basin Finance Journal*, 41, 111-127.

Fouche, C., Mukuddem-Petersen, J., Petersen, M., & Senosi, M. (2008). Bank Valuation and Its Connections with the Subprime Mortgage Crisis and Basel II Capital Accord. *Discrete Dynamics in Nature and Society*. doi:10.1155/2008/740845

Montes, C., Artigas, C., Cristófoli, M., & San Segundo, N. (2016). The impact of the IRB approach on the risk weights of European banks. *Journal of Financial Stability*. doi:10.1016/j.jfs.2016.11.004

Вулдридж, Д. (2009). Оценивание методом "разность разностей". *Квантиль(6)*, 25-47.