

Exploring Effectiveness and Efficiency of Banks in Switzerland

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DOI Link: <http://dx.doi.org/10.6007/IJARBSS/v4-i4/787>

Published Date: 25 April 2014

Abstract

The paper attempted to investigate the effectiveness and the efficiency of the Swiss banking sector, through the elaboration of solid econometric approaches focusing on solid scientific methodologies: effectiveness and efficiency. The two concepts make up a widespread in econometric literature, primarily to account for the performance determinants and optimal operating.

In the empirical investigation, we used data covering many financial and macroeconomic data about the Swiss banks sector in overall, focused on the period 1988 to 2011. We proceeded to build a reliable econometric model, according with the bulk of papers interested in the issue of the determinants of profitability of banks. The empirical investigation described the acting of these financial institutions by adopting rigorous econometric methodology.

Thus, the paper shed the light on the determinants of the profitability of Swiss banks, provides obvious explanation and bear out several conclusions in favour of the Swiss banks. In fact, the present paper underlines that banks in Switzerland are acting with efficiency and thus, it consolidates the reputation of the Swiss banking sector in the world.

Keywords: Bank, Financial Institutions, Profitability, Efficiency, Effectiveness.

JEL Classifications: D4, G21, G34, D61

1. Introduction

The banking sector has crucial role in the economy of any country, it satisfies the monetary needs of the economic actors, and the major role of banks remains in responding to the financial demand of the economic actors. The prime mission filled by banks is based on consolidating the financial stability of countries, and contributing to improve the wealth of the different actors: consumers and producers, by creating new financial products matching with them new needs. For many authors, it is highly evident that the performance of the banks tends to promote the growth, which confirmed by the survey of (Levine, 1999). The

author highlights that financial development tends to raise growth, in countries with developed financial market. But in the recent decades, many financial crises occurred and shook the international economy, and was considered by as serious threat for the current monetary system and the banking sector in all over the world. In this article, we will distinguish between effectiveness and efficiency econometric concepts, to evaluate the performance of the Swiss sector banking. Because, a bank could produce a good output, but if we take in consideration the value of its resources, the result reached could be considered as modest. So, a bank could be effective but not efficient, which accounts for the major contribution for using the efficiency concept in this paper.

2. Literature review:

The review of the economic literature about evaluating the performance of banks, leads us to adopt various financial indicators that were constructed by many researchers. In fact, the authors underlined the existence of three different approaches:

- The first approach is focused on the analysis of the bank balances, so the performance indicators elaborated depend highly on the bank operating, from these indicators we can cite: the net operating income or the gross operating income.
- The second type of indicators is conducted from other financial data representing the banks operating in the market, for example: the operating costs and the yield of the financial products and services provided by the bank.
- The third approach could be considered more interesting than the previous. In fact, it gathers indicators that are centred on the analysis of data demonstrating the banking sector structure, and it remains the most variables used in several surveys. For example, the return on asset (ROA) and the return on equity (ROE).

The review of the different approaches to measure bank performance cited above, allows us to emphasize the complexity of some profitability bank indicators, and such data remain tedious to gather. Because, it contains sensitive data about the bank performance, and when disclosed, will harm the bank benefits. Therefore, the sensitivity of some performance indicators allow us to adopt the third type of indicators to find out the determinants of banks profitability. So, the bank performance indicators involved in this paper are the ROA and the ROE, which remain the most used in academic papers and the best variable summarizing the returns of bank operating.

2.1 The factors of bank profitability:

Finding out the various factors affecting the bank profitability is not a new problem in economics, various surveys tried the analysis of this issue. But, there is a renewal on the empirical investigation like to find out specific features of monetary and banking systems effects on the bank profitability. In economic literature, we classify the factors affecting the profits generating by banks into two types of factors: internal and external.

2.1.1 The internal factors:

The internal factors contribute to summarize the features focused on the bank structure and the rule of management adopted by the financial institution. But, the gather of internal variables is tedious because of the sensitivity of data. Because, the reveal of such details about any firm, threatens its future profits and then its performance.

Using banking internal factors to account for the profitability of this sector remains important for surveys focused on panel econometric modelling. Although, in this empirical investigation,

we used macroeconomic variables to summarize all the internal factors that affect bank profitability. Because, the disparities and specific features of Swiss banks is not the main purpose of this paper.

2.1.2 The external factors:

For the external factors, they remain the most used in recent papers and empirical studies, they summarize economic and financial structure of the country. For this reason, we consider using such factors a consolidation for the macroeconomic approach to account for the determinants of banks profitability, primarily when applying the effectiveness and efficiency methodologies. We could summarize the external factors used in several studies and recent working papers, in the lines below:

- The size: In several papers, authors denoted that the size of bank and the profitability were highly joined, (Velanmpy and Nimalathan, 2010)¹ drew the same conclusion, they stress that: “correlation analysis demonstrates that: there is a positive relationship between firm size and profitability in Commercial bank”. The authors gathered evidence that small bank generated lowest benefits compared to others.
- The economies of scale: For the impact of the economies of scale on bank profitability, studies didn't gave a definitive conclusion about the real impact of these economies, the question remains unresolved, while surveys revealed contradictory results. For (Goddard et al, 2001)², economies of scale and the profitability of banks in Europe are joined positively, this conclusion were denied by (Scholtens, 2000), after founding that generated returns of small banks were rising faster than larger banks.
- The institutional quality: It is obvious to comply with the rise of profitability of banks and any firms due to improvement of the governance and the institutional quality. (Marcelin, 2010)³ stresses that the banks performance is highly joined with the institutional quality of the country. Because, it reduces the costs in the financial market, allows external finance and improves the value of financial portfolio.
- The concurrence in the market: When many banks are acting in the same market, a concurrence will born among them. So, every bank attempt to generate the maximum profit, by giving financial products and services at low prices, this behaviour tends to reduce their profitability. For (Northcott, 2004)⁴, the rise of competition among banks decreases the profits generated, because of reducing their surplus value created, the author emphasizes: “when bank competition increases, the surplus value that any one bank can extract from relationship loans decreases”.

¹ Velanmpy, T. and Nimalathan, B. 2010. Firm size on profitability: a comparative study of bank of Seylon and Commercial bank of Ceylon Ltd in Srilanka, Global journal of management and business research. Vol.10 Issue 2.

² Goddard J., Molyneux P. and Wilson J. O. S. 2004. The profitability of European banks: a cross sectional and dynamic panel analysis, The Manchester School Vol 72 N°3, June 2004.

³ Marcelin I. 2010. The relationships between institutions, financial development, banking performance, privatization, and growth, PH.D Department of Finance in the graduate School, Southern Illinois University Carbondale.

⁴ Northcott, C. A. 2004. Competition in banking: A review of the literature, working paper 2004 – 24, Bank of Canada.

2.2 The difference between effectiveness and the efficiency:

The effectiveness and the efficiency are two different concepts mostly used in academic papers and focused on firm management. The efficiency summarizes the idea to produce with the best manner, we can assume that efficiency is focused on the use of minimum inputs to produce the best output. It is based on the optimize use of resources to generate the best production with the minimum costs. In management, we can consider efficiency as the study of the optimized use of internal factors of the firm. But, the effectiveness concept summarizes the yield of factors and the reach of goal, without considering the manner and the resources optimized use. So, we can infer that effectiveness has strategic meaning in firm management, and attempt to reflect the impact of external factors on the firm production.

2.3 The assumptions:

The main object of this paper is to assess the effectiveness and the efficiency of the operating of Swiss banking sector in overall. Therefore, we assume that Swiss banks share the same economic behaviour in the market and use financial factors with the same manner. And we assume that the ratios ROA and ROE contribute to reflect the banks production.

3. The empirical validation:

In this empirical investigation, the econometric model attempt to find out the factors affecting Swiss bank profitability, using two different approaches: effectiveness and efficiency.

3.1 The methodology:

In order to evaluate the determinants of profitability the Swiss banking system in this paper, we conducted an empirical investigation, focusing on estimating an econometric model. Which remains in accordance with the recent empirical surveys of many authors. We can refer to (Molyneux and Thornton, 1996)⁵ and Wahid and (Rehman, 2009)⁶, many of them adopted the OLS method "ordinary least squares" to estimate their models.

3.2 The sample:

In the current paper, we used indicators and variables summarizing the Swiss banking sector, covering the period from 1988 to 2011. Due to limited data, we estimated the model based on multiple regression of the case of the banking sector in overall, but, finding data about individual banks will help us to elaborate other papers to assess the efficiency behaviour of the banks.

3.3 The model:

The paper attempt to account for the effectiveness and the efficiency of Swiss bank sector, focusing on exploring the profit generation through production function framework. The model estimated is relevant to the principles of production function off Cobb-Douglas, taking the following presentation:

$$Y_t = AX^\alpha Z^\beta \quad (1)$$

⁵ Yao, J. M. 2005. Approche économétrique des déterminants de la rentabilité des banques européennes, Université de Luxembourg.

⁶ Sufian, F. and Kamarudin, F. 2012. Bank-specific and Macroeconomic determinants of profitability of Bangladesh's Commercial Banks, Bangladesh Development Studies, Vol. XXXV, December 2012, N°. 4.

Making the logarithm of equation I, it leads to find the following equation:

$$\text{Log}Y_t = \text{constant} + \alpha X_t + \beta Z_t \quad (\text{II})$$

Where: Y: the output, X and Z the inputs and α and β are the elasticity coefficients of production by factor. The empirical investigation is focused on investigating the relationship between the bank performance and the internal and external financial and macroeconomic factors. The model is made up of the two following equations: The empirical methodology adopted in the paper is rigorous and remains in accordance with the recent development of William Greene (2003)⁷ about the stochastic frontier analysis.

- **Case 1: the effectiveness of the Swiss banking sector:**

$$\log(\text{profitability}_t) = \text{Constant} + \alpha \log(A_t) + \beta \log(B_t) + \delta \log(C_t) + \theta \log(D_t) + \rho \log(E_t) + \varepsilon_t \quad (\text{III})$$

- **Case 2: the efficiency of the Swiss banking sector:**

$$\log(\text{profitability}_t) = \text{Constant} + \alpha \log(A_t) + \beta \log(B_t) + \delta \log(C_t) + \theta \log(D_t) + \rho \log(E_t) + \delta_t + \varepsilon_t \quad (\text{IV})$$

For the dependent variable representing the profits generated by banks, we used two different indicators, the first is ROA (returns on assets) and the second is ROE (returns on equities). These indicators remain the best variables reflecting the profit generation in banking and taking in consideration the financial resources available for banks. The most of papers treating the issue of identifying the determinants of bank profitability, used these two indicators to give a financial measure of the profits generated by banks.

A_t , B_t , C_t , D_t and E_t are the explanatory variables, we used various indicators, that represent the external and the internal factors affecting the bank profitability. Finally, ε_t is the error term, and δ_t is the inefficiency term.

3.4 The data:

In the empirical investigation conducted in this paper, the author used macroeconomic variables, summarizing the Swiss banking sector in overall. The data is covering the two types of factors affecting the bank profitability, as described in the paper above: internal and external.

3.4.1 The internal variables:

The internal explanatory variables used in the modelling of this paper could be summarized in these lines:

- The bank assets: the indicator used is calculated from the assets of the central bank as share of the GDP.
- The bank credits allocated by the banking sector were calculated from the share of bank deposits.
- The cost of the bank in other studies had influenced the profits generation by banks, for this reason we used this ratio as a share of the income, to estimate its effect on the banks profitability. The use of the cost will be limited when conducting the estimation about finding out the impact of costs on bank profitability, through the effectiveness viewpoint.

⁷ Greene, W. 2003. Distinguishing between heterogeneity and inefficiency: Stochastic frontier Analysis of the world health organization's on national health care systems, Department of Economics, Stern School of business, New York University.

- The bank concentration ratio is used to evaluate the impact of the fragility of the Swiss banking system on the profitability. This ratio is widely used in studies and calculated by taking the assets of three largest banks as a share of assets of all commercial banks.
- The life insurance is measured through the life insurance premium value as share of GDP.
- The liquidity indicator is represented by the liquid liabilities of the bank, and is calculated by using the aggregate M3 as a share of GDP.

Also, we have used other financial indicators, like: the life insurance premium volume as a part of the GDP, the offshore bank deposit and the loans from non-resident banks. These variables could highly affect the finance in the economy of opened countries.

3.4.2 The external variables:

We used some external factors to represent the macroeconomic environment of the country, the first variable is the real interest rate that tends to affect directly the investment and the portfolio of the bank. And the second one is a monetary aggregate, it's the M2/GDP ratio used to represent the depth of the financial sector. In the estimation of the efficiency, we used solely variables referred to the financial environment, which we considered as production factors. The macroeconomic data are used when applying the effectiveness viewpoint, solely, in which the author attempts to examine the factors affecting the Swiss banking sector profitability.

3.4.3 The source of data:

In this empirical study, we used macroeconomic and financial data, they were collected from two different sources, as presented in the table 1:

Table 1. The variables used and their source.

The variable	The source
ROA (%)	(Beck et al, 2011)
ROE (%)	(Beck et al, 2011)
The liquid liabilities (M3/GDP)	(Beck et al, 2011)
The life insurance volume (%GDP)	(Beck et al, 2011)
The bank concentration ratio	(Beck et al, 2011)
The bank credit (%bank deposit)	(Beck et al, 2011)
The offshore bank deposit (%domestic deposit)	(Beck et al, 2011)
The loans from non-resident banks (%GDP)	(Beck et al, 2011)
The deposit money bank assets (%GDP)	(Beck et al, 2011)
The bank assets (%GDP)	(Beck et al, 2011)
The real interest rate	World development indicators 2013
The monetary aggregate M2 (%GDP)	World development indicators 2013

4. The Results:

The estimation of the model authorises us to highlight the following results that we could summarize in the table 2:

Table 2. The results of the effectiveness and the efficiency of the Swiss banking sector.

Models	Effectiveness	Efficiency	Effectiveness	Efficiency
Dependent variable	ROA	ROA	ROE	ROE
constant	133.2 (1.9)	223.4** (2.1)	-2.8*** (-3.7)	-2.75 (-1.19)
Assets	0.19* (0.24)	-0.4 (-0.38)	0.37 (1.6)	-0.17 (-0.4)
Aggregate M2 (%GDP)	-30.16* (-1.95)	-49.8** (-2.2)	--	--
Life insurance	-0.23 (-0.4)	-0.58 (-0.05)	0.18 (0.95)	0.39 (0.62)
Credits/deposits	-1.49 (-0.7)	-1.55 (-0.34)	1.89** (2.49)	1.16* (1.77)
Bank cost income ratio	-2.32** (-2.13)	--	-1.8*** (-5.2)	--
Liquid liabilities	32.3* (2.07)	50.2** (2.4)	4.27*** (7.7)	2.05** (1.97)
Real Interest rate	--	--	0.00008 (1.25)	0.0008 (0.03)
R2	61.4%	--	89.9%	--
DW	2.2	--	2.8	--
Fisher test	0.006	--	0.000	--

The explanatory variables figuring in the table 2 are used in the estimation, after making their logarithm. We used their original names from the database without adding the word logarithm.

5. interpretation:

In this article, we interpreted the results found from two optics: economic interpretation and effectiveness and efficiency interpretation.

5.1 Economic interpretation:

Based on the econometric tests applied to the estimated models in the empirical investigation, presented in table 2:

We can infer from complying with the value of R^2 , the importance of overall illustrating the power of the conducted model while R^2 is exceeding 60%. This authorizes us to denote that the models elaborated in this survey has significant explaining power about the reality of benefits generation in Swiss banks.

For the DW indicator, the test rejects the hypothesis of serial correlation of errors in this model, which represents a threatening phenomenon able to influence the validity of the results found. And finally, according to the results found from applying the Fisher test, it enabled us to consolidate the hypothesis about the global statistical significance of the conducted models. So, we can argue that all the tests applied in this empirical investigation are in favour of the credibility of the estimated models.

According to table 2, it's obvious that assets of the central bank tend to raise the profits generation of Swiss banking, effectively. Hence, the findings are bearing out the impact of assets in theoretical foundation, its coefficient is statistically significant at 10%. Therefore, an

increase in the assets virtually makes up an improvement in the liquid resources of all the bank system in general, which could positively affect its financial operations and loans attribution in the market. For (Bordeleau et al, 2010)⁸, the liquid assets holdings tend to account for the improvement of profitability in Canadian banks after crisis, compared to American banks. For the financial depth measured by the “M2 aggregate”, its effect is negative and statistically significant at 5%. But, the result is obvious and comply with the negative impact of the development level of the financial system on banks profitability in Switzerland, through raising concurrence between financial institutions. For the life insurance, it tends to raise bank profitability (in the case of ROE to represent the profitability) but its effect is not statistically significant, demonstrating that the profit generated from this service is less relatively to classical financial operations supplied by banks, like: checking, saving, check card, foreign currency. Therefore, the commitment of banks in life insurance could affect the bank profitability, like underlined by (Ponce, 2011)⁹. The author highlights that some banks could sell to their customers a life insurance with the mortgage loan, what the author calls “economies of scope” and these economies are raising bank profitability. It’s highly obvious that a rise in the credits/deposits ratio is joined with an increase in the bank’s profitability, the impact is statistically significant at 5% for the effectiveness and the efficiency approaches. Hence, the finding leads to infer that Swiss banking are acting with effectiveness and efficiency during the credit attribution operations, this conclusion is drawn from econometric viewpoint. The efficiency allocation in banking sector could be defined as, the ability to respond to market signals and to change the credit allocation from slow to fast growing industrial sector. According to (Battilossi et al, 2011)¹⁰, the efficiency of credit attribution in the Italian banking system has improved since the nineties, than periods before liberalization.

According to table 2, it’s obvious to denote that the bank cost/income ratio tends to harm the bank profitability, the negative impact is significant at least at 5%, when examining the effectiveness of the profit generation in Swiss banks. In the empirical investigation, the process conducted to identify the impact of the cost was limited on the effectiveness approach solely, due to the model specification adopted when estimating the efficiency concept. In fact, the choice adopted is focused on the production approach, where the explanatory variables are production factors and non-costs. In the economic literature, it’s obvious to deduce that a rise in the fees or costs supported by banks, should reduce their profits, by affecting their competitiveness and beneficial margin. (Bourke, 1989) drew the same conclusion, the author denoted that profitable banks have the ability to operate in market with lower costs. The negative effects of costs on bank profitability are also present when applying the efficiency approach, this finding consolidated previous conclusions underlined by other authors, like (Vong et al, 2009)¹¹: “One of the most internal factors that can be constructed from the income state is the efficiency in expenses management...”

⁸ Bordeleau, E. and Graham, C. 2010. The impact of liquidity on bank profitability, Working Paper 2010-38, Bank of Canada.

⁹ Ponce, T. A. 2011. What determines the profitability of banks? Evidence from Spain, Department of Business Administration.

¹⁰ Battilossi, S., Gigliobianco, A. and Marinelli, G. 2011. The allocative efficiency of the Italian banking system 1936 – 2010, Banco d’Italia.

¹¹ Vong, A. P. I. and Chan, H. S. 2009. Determinants of bank profitability in Macao.

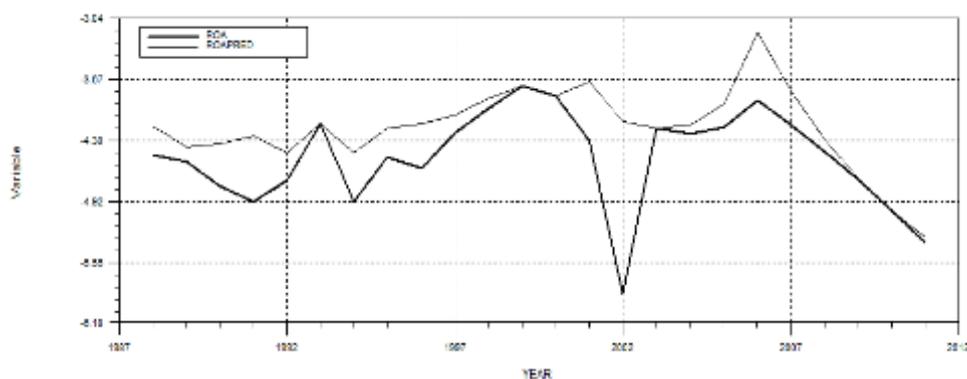
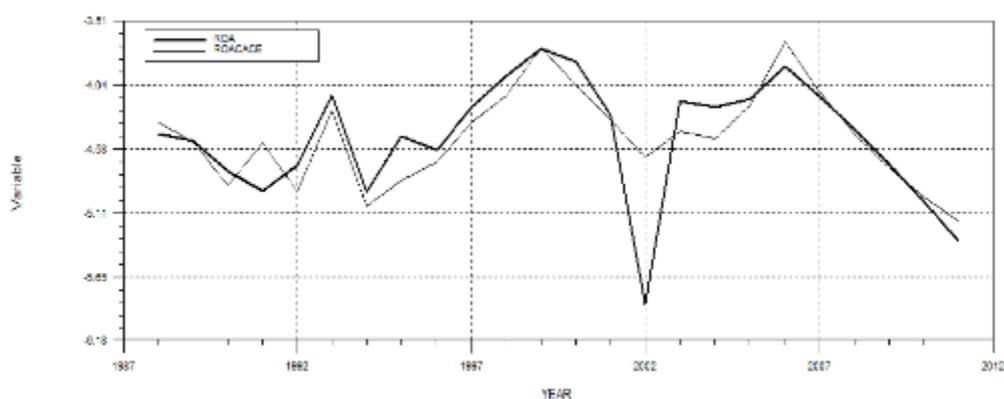
From table 2, it appears obvious to underline the positive impact of the liquid liabilities on the Swiss bank profitability, which is statistical significant at 5%. This effect may be illustrated by various economic developments advanced, which suggest that this aggregate reflects the financial development of the country, it is the same conclusion drawn by (Özman et al, 2012)¹². The authors denoted that the development of financial system, measured by liquid liabilities, encouraged the household to save using financial tools, which represented several investment opportunities, and in return, finish by increasing the internal funds of banks and its profitability. Hence, for the Swiss case, we should underline that financial development effect has prime role to improve the profits generated by the banks, bearing out that Swiss banking structure remains solid, and is acting with competitiveness and continues to focus on solid financial standard of developed country. The real interest rate tends to raise profitability of Swiss bank, but it is not statistically significant. This result is supporting the deduction that the rise in the real interest rate encourages that bank to borrow money, because its profitability will rise compared to inflation rate. In the paper of (Santoni, 2003)¹³, the author stressed that commercial bank decide to borrow money, focusing on expectations about the evolution of nominal inflation. Thus, a rise in expected inflation will push banks to raise the nominal interest rate applied on loans, attempting to preserve the same real interest rate.

5.2 Effectiveness and efficiency interpretation:

In this survey, we conducted graphics demonstrating the operating behaviour of Swiss banks, the first one represent the effectiveness and the efficiency of Swiss banking sector.

¹² Özman, E., Sahinöz, S. and Yalçın, C. 2012. Profitability, saving and investment of non-financial firms in Turkey, Central Bank of Republic of Turkey.

¹³ Santoni, G. J. 2003. The effect of inflation on commercial banks, Federal Reserve Bank of Saint Louis.

Fig. 1. Comparing current and efficient behavior of Swiss banking sector.**Fig. 2. Comparing current and effective behavior of Swiss banking sector.**

From the graphics trends demonstrating the current acting of banks in Switzerland and the optimized performing, we can denote that Swiss Banks are operating in the market with effectiveness and efficiency. Because the current operating is similar to the optimized operating demonstrated in the graphics.

There are many factors that are improving the behaviour of Swiss banks in the market, we can refer to the high development in the financial market, the openness of the Swiss economy and the financial means available for the banks. They tend to improve the benefits generation and provide to the financial institutions of this country high effectiveness and efficiency. The profitability of the Swiss banks depends on their assets and concentration in the market, these two variables are conducting the effective and efficient attitude of these banks in the market. So, we can infer that the Swiss banking market is allocating its financial resources with efficiency and effectiveness, and in return it finish by improving the profits generated in the banking sector. And eventually, the operating behaviour of the Swiss banking sector has been associated with the consolidation of the reputation of its banks, compared to the banks in the world.

The significant coefficient of liquid liabilities, allow us to deduce that the financial development has a prime effect on raising the profitability of Swiss banks. The coefficient reflects the financial development in Switzerland, and the implementation of financial standard to guarantee high quality of financial services, we can argue that Swiss banks has known how to adapt with the requirement of the several financial mutations, occurred after

the globalization. The effective and efficient behaviour of the Swiss banks contributed to account for the reputation of these financial institutions in the world.

6. Conclusion

The paper contributes in illuminating the determinants of the recorded performance of Swiss banking sector through examining its effectiveness and efficiency. The paper focused on drastic scientific approach, and attempted to analyze the Swiss banking behavior during operating and creating value in the market. The empirical investigation conducted in the current paper, contributed to provide new explanation about the reputation and the behaviour of the Swiss banking sector in whole. The constructed empirical modelling in the paper, was based on two viewpoints, which are relevant to recent econometric methodologies: the effectiveness and the efficiency.

The empirical investigation of this survey is consolidating the statement that Swiss financial institutions were operating with effectiveness and efficiency in the market, and the elaborated econometric model contributed to bear out the claims raised in various papers, reinforcing the banking acting in Switzerland. The attached graphics to paper above make up the best evidence about the conclusions drawn in this paper. The investigation illuminated the reality of the operating of the banking sector, and account for the good reputation of these financial institutions in international markets. Despite the frequent appearing of financial crisis during the nineties and the beginning of the new millennium, the Swiss banks continued to operate with effectiveness and efficiency after short period of adjustment after the crisis advent. The figures authorize us to denote the rapid readjustment of the bank acting for short time, for example: the case of the crisis occurred in 2002, matching in the graphics with the beginning of the Argentine crisis and crisis of Turkey.

The deriving of other data representing the performances of individual Swiss banks should interesting, and could help us to determine the disparities in financial means and concurrence in the market among banks, and their impact on the efficiency of every bank. And we can finish the paper by ranking the most efficient bank from the Swiss banking sector focusing on calculating their inefficiency term.

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