CAN FINANCIAL RATIOS INFLUENCE THE STOCK RETURNS OF FINANCIAL SECTOR COMPANIES IN AUSTRIA?

[Mohou finanční ukazatele ovlivnit akciové výnosy finančních společností v Rakousku?]

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Abstract: The stock prices of companies are influenced by many variables; two basic categories are macroeconomic and microeconomic factors. The objective of this paper is to analyze the existence of a relationship between select microeconomic variables and the stock returns of financial sector companies listed on the Vienna Stock Exchange. The institutions that were chosen are Immofinanz AG, Raiffeisen Bank International AG, Erste Group Bank AG, Uniqa Insurance Group AG and Vienna Insurance Group AG. The focus is on Austria due to the lack of empirical literature on problematics of linkages between stock prices and microeconomic factors. A possibility of the existence of the cointegration relationships can be a useful for share traders and investors who want to make higher profits. A time series with semi-annual frequency are used to examine the occurrence of long-term and short-term cointegration links using the Johansen and the Granger tests. Further the analysis of the Generalized method of moments. The empirical estimates are calculated for the 2005 – 2015 period, which includes the global financial crisis. According to the theory it is expected positive relationship between selected microeconomic variables and the stock returns.

Keywords: cointegration, financial ratios, financial sector, GMM, stock return, Vienna Stock Exchange.

JEL classification: O52, C58, G21

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Introduction

Company stock prices are influenced by many factors. There are two basic categories of variables that affect stock prices as follow; macroeconomic factors and microeconomic factors. This paper is oriented on microeconomic variables. Investors evaluate the prospects of companies, especially announcement results of business activity. The time before that is a source of fluctuations of stock prices and the announcement of results should cause the stabilization of fluctuations. It can be expected that some financial ratios can affect the stock prices or stock returns.

The analysis of the relationship is according to the Efficient Market Hypothesis (Fama 1970), an efficient market, all the relevant information are fully reflected in the current stock prices and preventing investors from earning abnormal profits. The pivotal study in this type of the research is contribution of Drummen and Zimmermann (1992). Their analysis showed the importance of various market and sector factors to European stock prices volatility.

This study is focused on stock returns and identifying the variables that affect the stock returns of financial institutions in Austria. It was selected the financial sector because it is an important component of every national economy and contributes a significant portion of the GDP. It was chosen the Vienna Stock Exchange because it is one of the oldest stock exchanges in the world and is a driving force that contributes substantially to the development of the Austrian market.

The market capitalization of the Vienna Stock Exchange is approximately 114.34 billion EUR in 2017Q3.

The objective of the contribution is to analyze the existence of the relationship between several microeconomic factors and the stock returns of financial sector companies listed on the Vienna Stock Exchange. Therefore, certain institutions are considered, including Erste Group Bank AG, Immofinanz AG, Raiffeisen Bank International AG, Uniqa Insurance Group AG and Vienna Insurance Group AG. All financial institutions are included in the ATX Financials. The ATX Financials (ATX FIN) is one of five capitalization-weighted price indexes, and is composed of 11 financial sector stocks. The capitalization of ATX FIN is approximately 11.91 billion EUR in 2017Q3. It was chosen only 5 financial institutions due to the significance of their market shares and the attainment of the required time series.

Microeconomic factors include the current ratio, the return on assets, the return on equity and the firm size. The problem is that there is a lack of empirical literature focuses on relationship between stock prices (returns) and financial ratios in Central European countries. I try to reference empirical literature that is relevant to the topic of the paper.

The paper is divided into five sections. The first is introduction, follows review of the literature where can be found some studies dealing with the issue. Information sources of data and using methodology are contained in the third section data and methodology. Achieved results are included in the part results containing the outputs used econometric tests. The important section of the article is also conclusion.

1 Review of the Literature

A lot of studies have been conducted to examine the linkage between microeconomic variables and stock prices or stock returns on the developed stock markets such as markets of the USA and Asia. But this research is oriented on Central European markets where we can find the lack of empirical literature on problematics of linkages between stock prices and microeconomic factors. The reason is marginal position of Central European stock markets as compared with developed stock markets. Therefore researchers are more focused on developed markets. The marginal position of Central European stock markets do not mean that these markets are insignificant and their position can be transformed over time.

It is solely considered literature that is relevant. It is cited relevant papers on microeconomic factors; it is also cited papers that discuss the Central and Eastern European markets but those do not directly address the relationship between microeconomic variables and stock prices or stock returns.

Here can be including Pajuste et al. (2000) who examined a wide set of risk factors that may influence equity market fluctuations in the Czech Republic, Estonia, Hungary, Poland and Slovenia. They found out that local risk factors are the most important in explaining fluctuations of stock returns in these 5 countries. And the most significant factor is the market risk.

Casterén et al. (2006) analyzed the driving forces of EU banks stock returns. They used 53 EU banks and data from 1991 to 2004. They found that while in the short-term expected returns are mainly driven by the momentum of past returns and past leverage, over longer term returns show some mean reversion to shocks. At the same time, the positive covariance between the return news components showed that the market tends to initially underreact to positive news on bank-specific fundamentals and only gradually incorporate such information into the prices.

McKnight and Todd (2006) analyzed the role of earnings forecast revisions by equity analysts in predicting the cross section of European stock returns. They used a sample of 3 084 firms from 13 European countries, including Austria. Their sample period was from May 1988 to November 2001. They showed that European stock returns are positively related to their measure of forecast revisions. In contrast, they found that neither the mean consensus recommendation nor changes in that metric are significant in explaining the cross section of European stock returns.

Bessler et al. (2007) examined the impact of individual bank fundamental variables on stock market returns using data from a panel of 235 European banks from 1991 to 2005. Their results indicate that several bank-specific variables exhibit a robust explanatory power across different model specifications. The most important finding is a positive impact of the ratio of loans to total assets, the ratio of non-interest income to total income, and the ratio of off-balance sheet items to total assets on subsequent bank stock returns.

Asteriou and Dimitropoulos (2009) analyzed specific ratios and their impact on stock returns of 101 non-financial firms listed at the Athens Stock Exchange from 1995 to 2004. The results show that the ratios of working capital to total assets and net profit to sales have a negative impact on stock returns, while the ratios of net profit to total assets and sales to total assets affect returns positively.

Sivaprasad and Muradoglu (2009) investigated the effect of firm´s leverage on stock returns. They used 788 non – financial companies listed on London Stock Exchange for the period 1980 – 2008. Data were classified into 9 main industries: oil&gas, basic material, industries, consumer – goods, healthcare, consumer – services, telecommunications, utilities and technology. The results showed that leverage has a negative relation to stock returns.

Dzikevičius and Šaranda (2011) determined whether it is possible to forecast stock prices by estimating the financial ratios of a particular company in the Lithuanian stock market. They used correlation and covariance as the main analytical tools. They chose 5 companies and calculated with 20 financial ratios. They found out positive and negative links between stock returns and financial ratios, but results can be different depending on the method of calculation ratios.

Afzal and Mirza (2011) explored the power of the FF three – factor model in an international framework. They selected stock s from 15 European countries and sorted them into six portfolios at the intersection of size and book – to – market value. Data were employed for a period from January 2002 to December 2006. The results showed that except for one portfolio the model could not explain global European portfolio returns.

Atanasov and Nitschka (2013) investigated influence of the size effect and momentum factor on stock returns. They formed 25 portfolios, the European portfolio involve 16 states including Austria. The sample period covered data from 1990 to 2012. They found that the small stock component of value and momentum factors can explain differences in returns on regional and global size, value and momentum portfolios. This result does not hold for the big stock component of common risk factors.

Berglund and Bergman (2013) analyzed from two perspectives the performance predictability of financial ratios on Swedish listed firms by using statistical methods and fundamental analysis. The Swedish market was analyzed for the time period of 1980 – 2013. This paper has

come to the conclusion that the predictability power of financial ratios does exist to some degree when using statistical methods, however, the significant observations were few and results were viewed as anomalies rather than true relationships.

2 Data and Methodology

It was used five financial institutions that are listed on the Vienna Stock Exchange: Erste Group Bank AG (EGBA), Immofinanz AG (IA), Raiffeisen Bank International AG (RBIA), Uniqa Insurance Group AG (UIGA) and Vienna Insurance Group AG (VIGA). Semi-annual data from the 2005 – 2015 periods in EUR are used. The stock price data are from the Vienna Stock Exchange database.

Erste Group Bank AG is the leading bank in Central and Eastern Europe. Erste Group Bank AG is the owner of Česká spořitelna and Slovenská sporiteľňa. The total assets of Česká spořitelna were 1 037.3 billion CZK, Slovenská sporiteľňa had 14 billion EUR in assets in 2015. The total assets of Erste Group Bank AG increased to 204.5 billion EUR in 2015. Vienna Insurance Group is one of the leading insurance groups in Austria and Central and Eastern Europe, a premium volume was approximately 9 billion EUR in 2015. The Vienna Insurance Group now operates in 25 markets; the most important market is in Austria with market share of approximately 24 %.

Raiffeisen Bank International is a leading commercial and investment bank in Austria with an internet market share of 42 %. The UNIQA Group is insurance group and its core markets are in Austria and Central and Eastern Europe. The UNIQA Group and Raiffeisen Versicherung have the two strongest insurance brands in Austria. Immofinanz AG is a commercial real estate company that is focused on the retail and office segments in European markets. The company has a real estate portfolio of approximately 5.4 billion EUR.

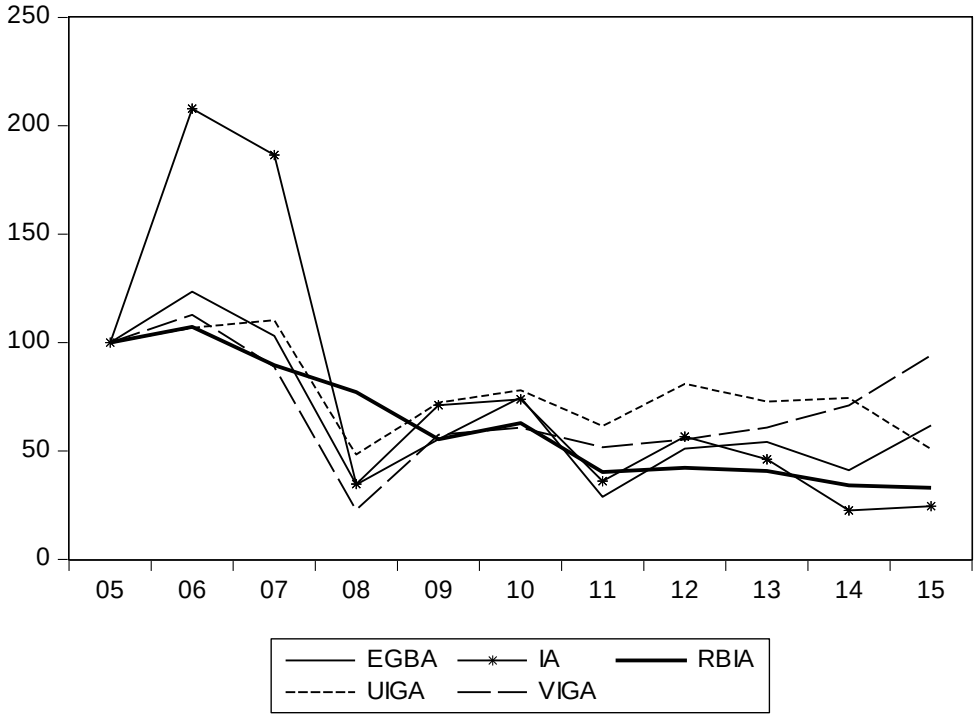
The microeconomic factors studied are as follows: the current ratio (L3) calculated as current assets/current liabilities; the return on assets (ROA) calculated as net income/total assets; the return on equity (ROE) calculated as net income/equity capital and the firm size (FS) measured by total assets in billion EUR. These time series are from financial statements of the companies. The L3 gives us the information that there is a sufficient amount of short-term assets to cover its short-term liability position. The ROA and the ROE present how well the firm uses its resources in generating profit. And the FS is connected with business activities and it is related to the possibility of making higher profit.

The ROA and the ROE are related to the goal of banks which is the maximizing profits and wealth of their owners. The liquidity is important variable, because banks must be able to give deposits on demand to their clients. Banks also have to pay current costs and liabilities. The FS reflects the position the company on the market with comparing with the competitors and influences the market capitalization of financial institutions on stock markets.

According to the theory the growth of all selected financial ratios should cause the growth of the stock prices and stock returns. There it is the possibility of short term relationship between financial ratios and stock returns, this is a situation when stock markets absorb information soon after the publishing the financial reports. Then, in the case of long term relationship between financial ratios and stock returns, it is assumed the effect of the selected microeconomic variables on stock returns is in the longer period.

Before calculating the empirical estimations, it was utilized chart that show the behaviour of stock prices; thus, we could find descriptive statistics. Fig. 1. shows the behaviour of the stock prices of EGBA, IA, RBIA, UIGA and VIGA from 2005 – 2015; the values are semi-annual end, and all data are in EUR. Fig. 1. shows that the fluctuation of stock prices in the RBIA and VIGA were very similar in some years. The development of EGBA and UIGA were nearly identical. The development of stock price of the IA stock price has the most pronounced changes, mainly a sharp decline at the beginning of 2009. All stock prices decreased in 2009; however, IA decreased the most. A decrease in stock prices in 2009 may have been caused by the beginning of the global financial crisis and fears regarding the economic development in Central and Eastern European countries. This finding mean lower capital and lower capital quality, higher risk exposure, lower asset quality, problems with loan repayments, uncertainty in dividend policy, underpricing of risks, higher volatility, and lower profitability; all these represent potential losses for the financial sector.

Figure 1: Development of stock prices in % (2005 = 100 %)



Source: Vienna Stock Exchange

Table 1. shows the descriptive statistics of select financial institutions listed on the Vienna stock exchange. It is specified the mean, median, maximum, minimum and standard deviation. The table shows that the maximum value of the stock returns is 6.20 EUR for RBIA, and the minimum value of IA is -7.71 EUR. The standard deviation, which is the highest for IA, means the market risk.

Table 1: Descriptive statistics of stock returns

	EGBA	IA	RBIA	UIGA	VIGA
Mean	0.0804	-0.3613	-0.1255	0.2937	-0.1196
Median	0.1521	0.0000	-0.2898	0.2540	-0.1356
Maximum	2.9555	4.7221	6.2067	3.2280	4.3596
Minimum	-3.2600	-7.7146	-4.0030	-1.9060	-3.4219
Std. Dev.	1.5880	2.2427	2.1872	1.3805	1.7115

Source: Authors´calculations.

After providing the figure for the development of stock prices and descriptive statistics, it is presented the methodology. First, it was checked the stationarity of the time series. We have more methods for implementing stationarity tests. In the empirical literature, the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests are used to verify whether the time series are stationary or not.

Table 2: Results of ADF unit root test

	ADF - returns	*ADF - ROA*	*ADF - ROE*	*ADF - L3*	*ADF - FS*
EGBA	-3.6647**(0)	-5.7403*(0)	-5.3030*(0)	-22.0337*(1)	-1.7807**(1)
IA	-5.0421*(0)	-3.7377**(0)	-4.2269*(0)	-12.9779*(0)	-12.1882*(1)
RBIA	-3.8511*(0)	-20.7394*(1)	-23.0328*(1)	-4.0115*(1)	-4.1879*(1)
UIGA	-5.2780*(0)	-4.7810*(0)	-5.1314*(0)	-6.1514*(1)	-4.0628*(1)
VIGA	-4.7911*(0)	-4.3419*(1)	-3.1546**(1)	-10.9616*(0)	-5.3991*(1)

Source: Authors´calculations.
*Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels. (0) means stationarity at the level and (1) means stationarity at the first difference.*

The results of the ADF unit root test and the PP test in Table 2. and Table 3. show that both tests were able to identically evaluate the time series stationarity. The results demonstrate that time series are stationary either at level or at the first difference.

Table 3: Results of PP unit root test

	PP - returns	*PP - ROA*	*PP - ROE*	*PP - L3*	*PP - FS*
EGBA	-3.6628**(0)	-5.6478*(0)	-5.2626*(0)	-22.0337*(1)	-3.7436**(1)
IA	-5.0457*(0)	-3.6660**(0)	-4.2269*(0)	-12.8354*(0)	-12.8111*(1)
RBIA	-3.8447*(0)	-20.0724*(1)	-24.7114*(1)	-5.1051*(1)	-4.2019*(1)
UIGA	-6.3665*(0)	-4.7810*(0)	-5.1314*(0)	-7.6429*(1)	-4.0495*(1)
VIGA	-5.6437*(0)	-4.5062*(1)	-5.6188*(1)	-21.2878*(0)	-5.4183*(1)

Source: Authors´calculations.
*Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels. (0) means stationarity at the level and (1) means stationarity at the first difference.*

Then, data were subjected to correlation analyses to determine the linear relationship between the stock returns and the microeconomic variables. Correlation analyses results can be between -1 to 1.

Thereafter, it was examined the long-term equilibrium relationships using the Johansen test to determine the presence of cointegrating vectors, VAR. The equation used for the VAR model is (Johansen and Juselius, 1990):

$$\Delta Y_t = C_0 + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-1} + \Pi Y_{t-1} + \eta_t \qquad (1)$$

where Yt is a vector of non-stationary variables, C_0 is a constant and η_t is the white noise term. The information on the coefficient matrix between the levels of the Π is decomposed as $\Pi = \alpha\beta'$ where the relevant elements of the α matrix are adjustment coefficients, and the β matrix contains the cointegrating vectors. The first likelihood ratio statistics for the null hypothesis of the precise r cointegrating vectors against the alternative r + 1 vector is the maximum eigenvalue statistic. The second statistic for the hypothesis of at most r cointegrating vectors against the alternative is the Trace statistic.

Furthermore the analysis of the short-term causality of the relationship between stock returns and microeconomic variables is performed using the Granger test; the causal model in the mathematical equation is in accordance with Granger (1969):

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{q} \beta_{1i} \Delta Y_{t-i} + \sum_{i=1}^{q} \beta_{2i} \Delta X_{t-i} + \varepsilon_{1t} \quad (2)$$

$$\Delta X_t = \varphi_0 + \sum_{i=1}^{r} \varphi_{1i} \Delta X_{t-i} + \sum_{i=1}^{r} \varphi_{2i} \Delta Y_{t-i} + \varepsilon_{2t} \quad (3)$$

where Y_t and X_t represent stock returns and microeconomic variables, respectively. Coefficient t symbolizes the time period, ε_{1t} and ε_{2t} are uncorrelated stationary random variables. The objective of this test is to reject the H_0: $\beta_{21} = \beta_{22} = ... = \beta_{2q} = 0$. This hypothesis implies that microeconomic variables do not Granger cause stock returns. Similarly, failing to reject H_0: $\varphi_{11} = \varphi_{12} = ... = \varphi_{1r} = 0$ suggests that stock returns do not Granger cause microeconomic factors.

After that an estimation procedure of the Generalized Method of Moments (GMM) follows. The analysis shows how stock returns are influenced by selected microeconomic factors in the previous period. The general model can be mathematically expressed by following equation (Hansen 1982):

$$Y_{it} = \alpha_1 + \beta_1 * Y_{i(t-1)} + \beta_2 * X_{it} + \varepsilon_{it} \quad (4)$$

where Y_{it} present endogenous variable, specifically stock returns. α_1 is a constant, coefficient t symbolized the time period and ε_{it} is random variable. Independent variable is the delayed value of the previous year $Y_{i(t-1)}$ and X_{it} which represents all independently variables that are subject to investigation, they are selected macroeconomic factors. β_1 and β_2 are estimated coefficients.

3 Results

At the beginning, it was calculated correlation coefficients between the stock returns and the financial ratios and firm size and identified the lag used in the cointegration tests. The resulting correlation matrix is provided in Table 4. The correlation coefficients between the stock returns and microeconomic variables are negative or positive. The coefficients of all microeconomic factors are frequently insignificant; this indicates that the co-movements with stock returns are not sufficiently strong.

Table 4: Correlation Matrix

	EGBA	IA	RBIA	UIGA	VIGA
L3	0.1974	-0.2405	-0.1204	0.0801	-0.0661
ROA	-0.1564	0.2003	-0.1790	-0.0628	-0.2751
ROE	0.1580	0.0631	-0.1832	-0.0589	-0.2096
FS	0.0461	0.0638	0.1609	-0.0689	0.0934

Source: Authors´calculations.
*Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.*

In Table 5., we can find results of the Johansen cointegration test. It was used Trace statistics and Max - Eigen Statistics. The stock returns and microeconomic variables proved to be cointegrated in three out of five models estimated. No long- run equilibrium relationship between the stock returns and microeconomic variables was revealed in the UIGA and VIGA models. Both statistics are important for our conclusion because both provide a similar outcome, in three cases were found two cointegrating vectors. According to the results it seems that the most important variable that can influence the stock returns in the long-term is L3.

Table 5: Results of the Johansen test

	r=0	r ≤1	r ≤2	r ≤3	r ≤4
EGBA / L3, ROA, ROE, FS					
Trace Statistics	91.6593*	54.6877**	28.4203***	16.1638**	4.0850**
Max-Eigen Statistics	36.9716**	26.2673***	12.2565	12.0787	4.0850
IA / L3, ROA, ROE, FS					
Trace Statistics	119.1150*	54.1193**	19.7563	9.7822	3.3194
Max-Eigen Statistics	64.9956*	34.3629*	9.9741	6.4628	3.3194
RBIA / L3, ROA, ROE, FS					
Trace Statistics	131.3276*	82.3644*	37.3602**	16.7962	4.9870
Max-Eigen Statistics	48.9631*	45.0041*	20.5640	11.8092	4.9870
UIGA / L3, ROA, ROE, FS					
Trace Statistics	75.1526***	38.4980	19.6053	9.8660	2.0506
Max-Eigen Statistics	36.6546**	18.8927	9.7393	7.8153	2.0506
VIGA / L3, ROA, ROE, FS					
Trace Statistics	106.2108*	61.7628*	38.2924**	19.3765**	3.7773
Max-Eigen Statistics	44.4479*	23.4704	18.9159	15.5991	3.7773

Source: Authors´calculations.
*Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.*

Then, there was tested the short-term relationship between stock returns and microeconomic variables. This causality linkage was analyzed using the Granger causality test. The statistically significant results of the Granger causality test for the institutions analyzed show Table 6. The Granger causality was detected between the stock returns of EGBA and L3, UIGA and ROE. It was also detected the causality in the opposite direction going from the RBIA stock returns to the FS. Other results are statistically insignificant.

Table 6: Results of the Granger causality test

	F-statistic	*Probability*
EGBA		
L3 =/=> EGBA	3.9821***	0.0613
RBIA		
RBIA =/=> FS	3.8539***	0.0653
UIGA		
ROE =/=> UIGA	3.2492***	0.0882

Source: Authors´ calculations.
*Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.*

Due to the results of the cointegration tests, I tried to apply the Generalized method of moments (GMM). The GMM results for financial companies are provided in Table 7. Data had to be processed in the panel to use this method. J-statistic is not higher than 0.05 which show that coefficients are not statistically significant. It is not possible to confirm or disprove that the selected microeconomic factors influenced stock returns. Statistically significant effects were not found by the GMM method.

Table 7: Results of GMM

	Coefficients	*Probability*
Stock returns $_{(t-1)}$	2.2764	0.5856
L3	0.6038	0.6954
ROA	318.2803	0.6107
ROE	-25.2588	0.5365
SIZE	0.0183	0.6380
J-statistic	0.0385	

Source: Authors´ calculations.
*Note: *, ** and *** denote significance at the 1 %, 5 % and 10 % levels.*

Conclusion

The objective of this study was to analyze the existence of the relationship between select microeconomic variables and the financial sector stock returns of stocks listed on the Vienna Stock Exchange. The sample period was from 2005 to 2015.

It was used the Johansen cointegration test to examine long-run equilibrium relationships between the stock returns of Austrian financial institutions and L3, ROA, ROE and FS. It was detected a significant relationship between stock returns of EGBA, IA, RBIA and L3 with using the Trace Statistics and the Max – Eigen Statistics. The liquidity can be considered as an important variable in long-term because banks must be able to give deposits on demand to their clients and they have money on their bank accounts in long-term. The liquidity is an important variable in the banking sector.

Then it was investigated short-run dynamics between the stock returns of Austrian financial institutions and the microeconomic variables using Granger causality tests. The Granger causality was detected between the stock returns of EGBA and L3, UIGA and ROE. The result of UIGA is consistent with Asteriou and Dimitropoulos (2009) whose results showed positive impact of the rentability on the stock returns.

It was also applicate the GMM. But statistically significant effects were not found with using this method. In consequence it was not possible confirm or disprove that the selected microeconomic factors influenced stock returns. The results of the GMM indicate the similar findings as in the study of Mirza and Afzal (2011), their analysis showed that selected financial ratios could not explain global European portfolios returns. The findings of Berglund and Bergman (2013) also support these results.

According to the theory it was expected positive relationship between selected microeconomic variables and stock returns. Empirical results detected positive trend but also negative trend of the linkages between selected financial ratios and stock returns as in the study of Dzikevičius and Šaranda (2011).

The results of this paper indicate that linkages between the stock returns of Austrian financial institutions and select microeconomic variables are very sporadic. I try to identify some reasons why these results are achieved. First, the results may be related to the orientation of the Austrian financial system on banks. Second, investors and traders can monitor different factors or make decisions based on other information, such as macroeconomic variables, and they do not include all available information into their decisions. Even if financial ratios are the key variables that are related to the position the companies on the market and their business activities. Third, investors and traders can include selected financial ratios into their decisions but they can evaluate this information wrong, the result is the discrepancy between the theoretical framework and empirical results. In this case, the investors' psychology presents the important role.

The business activity of companies can influence the stock prices in various extents. It is advisable to examine this topic because the existence of the cointegration relationships between stock returns and microeconomic variables can be useful for the share traders and investors who can achieve the higher profits.

The following research could be extended to other financial ratios and utilization of different statistical method to determine the existence of possible linkages between the stock returns and other financial ratios.

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