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Financial Internet Quarterly 2020, vol. 16 / no. 1, p. 67-74

DOI: 10.2478/fiqf-2020-0007

Financial Internet Quarterly

THE ROLE OF MAIN MICROECONOMIC FACTORS ON THE STOCK PRICES OF SELECTED SWISS COMPANIES

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Abstract

This paper examines the role of main microeconomic factors on the stock prices of selected Swiss companies listed on the Six Swiss Exchange. Two basic theoretical approaches and interpretations of this relationship are frequently used. The efficient market hypothesis (Fama, 1970) assumes that stock prices already contain all the relevant information and the theory of arbitration (Ross, 1976, or Chen et al., 1986). The microeconomic factors are based on the financial situation in companies. Financial ratios, taken from the financial statements of the individual companies, are used for the analysis. In general, the study confirmed that profitability and debt ratios are the most important business factors from the prospective of impact on stock prices. The relationship between the observed variables is explored using panel regression analysis. The generalized method of moments for constructing a regression model is used. The sample period of the dataset is composed of annual data from 2006 to 2015.

JEL classification: C58, D24, G21
Keywords: Financial ratios, panel regression, stock prices

Received: 14.03.2020 Accepted: 30.03.2020

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Introduction

There is an extensive discussion in finance studies on how investment decisions are largely influenced by the release of corporate financial information, and that capital market participants tend to follow closely the release of corporate financial information. Finance literature is replete with theories (Efficient Market Hypothesis Theories, signaling models, Pecking Order Theories, Capital Asset Pricing Theories, Arbitrage Pricing Theories, or Theories on Dividend policy) that suggest that stock prices change in response to knowledge of a number of variables. Some of these important variables include earnings, dividends, cash flow projections, net assets, returns on capital employed, debt to equity ratio, etc. Most of these variables are usually announced in the financial statements or they are derived from information contained in the financial statements.

Even though the financial statements are often published quarterly, it is important to find out whether or not the results of performance indicated by the financial statements have any influence on the stock prices. According to Cohen and Lys (2006) or Myring (2006), there are several factors that account for changes in share prices, which are not necessarily linked to performance measured by microeconomic results. An important question to ascertain is whether stock prices change in accordance with the performance of listed companies as reported by their financial statements.

This paper examines the role of main microeconomic factors on the stock prices of selected Swiss companies from the professional, scientific and technical services sector listed on the Six Swiss Exchange. The microeconomic factors are based on the financial situation in companies. Financial ratios, gained from the financial statements of the individual companies, are used for the analysis. The relationship between the observed variables is explored using panel regression analysis. The generalized method of moments for constructing a regression model is used. The sample period of the dataset is composed of annual data from 2006 to 2015.

This paper presents an overview of statistics for the Suisse (Swiss) professional, scientific and technical services sector, as covered by NACE Rev. 2 Section M. These activities often require a high degree of education and training and make specialized knowledge and skills available to clients who may be other business users or private individuals. The professional, scientific and technical services sector can be divided into seven subsectors at the NACE division level. Among these, there were three subsectors that dominated the overall level of activity in terms of their contribution to value added and employment. Legal and accounting activities combined with the architectural, engineering, technical testing and analysis activities and the head offices and of management consultancy activities provided 79.2 % of EU-28 sectorial value added and 74.9 % of sectorial employment. The largest labor productivity of the professional, scientific and technical services sector in Europe in 2015, with EUR 128.6 thousand per person employed was in Switzerland. The service sector has come to play a significant economic role overall. The economy of Switzerland ranks first in the world in the 2015 Global Innovation Index and the 2017 Global Competitiveness Report.

The remainder of this paper is organized as follows. The relevant literature is reviewed in Section 2. The data and the methodology used in this paper are introduced in Section 3. The results of the empirical estimation are reported in Section 4. The conclusions and summary of the main findings are contained in Section 5.

Literature Review

The Swiss stock market deserves special attention because there has been a long-time effect of the Swiss franc (CHF) status of a “safe haven” currency, i.e. a currency that offers hedging value against global risk, both on average and especially in crisis periods. It has been confirmed by Stalder (2016), when the worldwide financial turbulences of 2008 and the consequent European debt crisis put the Swiss franc under persistent upward pressure, prompting the Swiss National Bank to lower short-term interest rates as far as possible. It analyzes the relationship between exchange rate shocks, the reaction of monetary policy and the resulting repercussions on the housing market. The econometric analysis supports this view but also shows that the turnaround takes place rather smoothly as long as the strength of the Swiss franc and low interest rates persist.

This paper examines the role of main microeconomic factors on the stock prices of select Swiss companies from the professional, scientific and technical services sector listed on the Six Swiss Exchange. Financial studies find that financial measures, such as leverage, profitability,

liquidity and growth affect the decision to voluntarily adopt an accounting policy or regulation. Firms may voluntarily abide by an accounting regulation in order to influence their financial performance and suit their corporate plans.

Myring (2006) asserted that assessing the usefulness of financial information has become the primary goal of accounting research. In his study, he used the earnings-returns relationship to examine the usefulness of earnings in an international setting. Specifically, Myring examined the monthly market reaction to unexpected earnings. The results of analyses using data from the entire time period pooled by accounting regimes reveal a significant market reaction to the announcement of earnings in all regimes. This indicates that investors view accounting information as value relevant and react when earnings do not meet expectations. This implies that in recent years investors are more likely to react to the release of earnings. In addition, the results suggest that investors are more likely to incorporate analyst forecasts into earnings estimates in recent years.

In this relation, Bradshaw, Richardson, and Sloan (2006) examine the relationship between firms' external financing activities, future stock returns, future profitability and analysts' forecasts. In addition to investigating future stock returns and profitability following firms' corporate financing activities, they analyze analysts' short-term and long-term earnings forecasts, growth forecasts, stock recommendations, and target prices. Their primary findings are that there exists a negative and statistically significant relation between net external financing and future stock returns, and future profitability, and a positive relation with optimism in analysts' forecasts. The conditions under which corporate investment is sensitive to non-fundamental movements in stock prices were investigated by Baker, Stein and Wurgler (2003). They use a simple model to outline. The key conclusion is that stock prices have a stronger impact on the investment of "equity-dependent" firms that need external equity to finance marginal investments.

The purpose of the article by Arkan (2016) was to investigate the importance of financial ratios derived from financial statements to predict stock price trends in emerging markets. An equation to estimate the stock price in each sector was constructed according to the multiple regression model after eliminating non-effective variables with the STEPWISE method. The results showed that some ratios could give strong positive and significant relationships to stock price behaviour and trends, the most effective ratios on the stock price for the industrial sector are ROA, ROE and net profit ratio.

Stancu and Stancu (2014) investigated the relationship between asset returns and market risk (a one factor model), as such, alternative multifactor models that use macroeconomic or microeconomic factors have been sought to gain further insight into this relationship. This article has its main focus on multifactor models that consider microeconomic factors. More specifically, they looked at the following factors and their role in explaining the variation of stock returns: market capitalization, stock beta, market-to-book (MB) and price-to-earnings (PE) ratios, leverage ratio, return on assets (ROA) and return on equity (ROE). Considering different panel regression methods, they found the variation of percentage changes in market capitalisation and in MB ratio the leading variables in explaining the variation of stock returns. Similarly, Schrimpf (2010) in his study determined the predictability of the profitability of companies on the stock exchange using their financial ratios. In his research, he concludes that a financial ratio analysis can have a high correlation with profitability and predictability by multiple regression financial ratios, including a profitability test contract. The companies with low and high profitability were divided into two groups and the results of his research indicate a high potential for profitability in the projected financial ratios.

By contrast, the results of the Bratland, Hornbrinck (2013) study show no clear relationship between Swedish firms' working capital policy and the stock return. Regarding the relation with risk and return, the result indicates that working capital has a significant correlation with risk and that the aggressive policy of managing working capital is more risky. Moreover, the size of firms does not affect the relationship between working capital policies and stock return either.

Data and methods

The sample data

The professional, scientific and technical services sector in Switzerland includes a total of 240 very large and large companies, with 29 companies operating on the stock market. Their market capitalization within this sector and within all sectors of the economy can be seen

in Table 1. Selected companies that meet the sampled criteria have an 80% of sector market capitalization and 30% of total market capitalization, which only confirms the importance of the selected companies in the Swiss economy. The highest market capitalization is held by the international pharmaceutical company Hoffmann-La Roche AG, based in Basel, Switzerland. In 2013, it ranked third among the world's largest pharmaceutical and biotechnology companies.

Stock prices of selected companies are based on average quarterly values. Due to the large number of monitored companies, the following analyses will be based on panel data and panel analyses. The average stock price development of the selected companies shown in Figure 1 shows the fall between 2007 and 2009 at the time of the global financial crisis. Part of Figure 1 is also a link to the stock price trend, which, despite the slump, has a growing tendency and in the years to come, the share prices of these companies should continue to grow.

The study will use selected micro-variables obtained from the financial statements as explanatory variables for stock prices. The financial ratios under investigation are the debt equity ratio, liquidity ratios L1 and L2, return on assets. The above variables have been chosen because they have been widely used as measures of the performance of business enterprises in the empirical literature and their basic statistical characteristics are mentioned in Table 2. These factors measure the profitability, asset base and capital structure of enterprises.

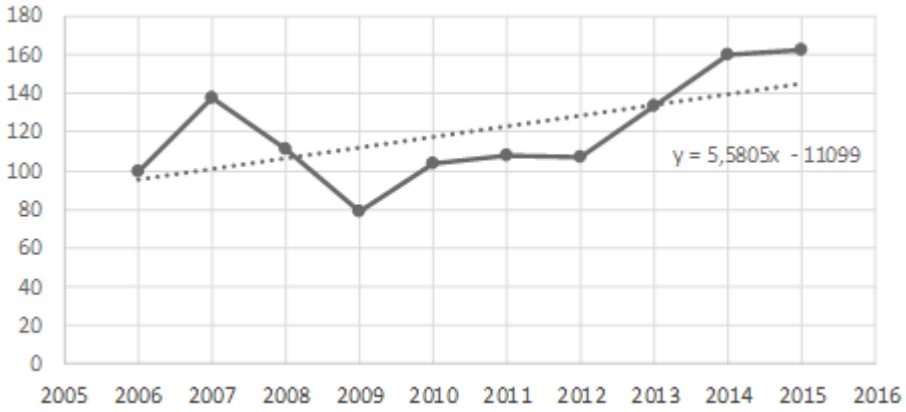
The first ratio under investigation is the Debt to equity ratio (DE). This ratio shows the mix of Debt and Equity in the total capital of the company. The DE ratio measures a company's debt relative to the total value of its stock. A high DE ratio generally means that a company has been aggressive in financing its growth with debt. Aggressive leveraging practices are often associated with high levels of risk. This may result in volatile earnings as a result of the additional interest expense. However, if the cost of

Table 1: The importance of the selected companies (in mil. EUR and in %)

COMPANY	MARKET CAP. (MIL. EUR)	SHARE OF SECTOR (%)	SHARE OF MARKET (%)	COMPANY	MARKET CAP. (MIL. EUR)	SHARE OF SECTOR (%)	SHARE OF MARKET (%)
ABB LTD	46373,20	11,59	4,36	GEORG FISCHER AG	3202,31	0,80	0,30
ALLREAL AG	2210,59	0,55	0,21	IMPLENIA AG	1332,28	0,33	0,13
ALPIQ AG	2246,81	0,56	0,21	INTERROLL AG	882,53	0,22	0,08
ALSO AG	1118,29	0,28	0,11	KOMAX AG	861,99	0,22	0,08
APG SGA SA	1257,98	0,31	0,12	LAFARGEHOLCIM LTD	29747,47	7,43	2,79
BARRY CALLEBAUT AG	6418,98	1,60	0,60	LONZA GROUP AG	9053,87	2,26	0,85
BOSSARD AG	948,10	0,24	0,09	OC OERLIKON CORP. AG	3482,60	0,87	0,33
BUCHER INDUSTRIES AG	2478,57	0,62	0,23	ROCHE AG	154241,42	38,55	14,49
BURCKHARDT COMPRESION AG	934,63	0,23	0,09	SCHINDLER AG	6950,88	1,74	0,65
CLARIANT AG	5657,35	1,41	0,53	SIEGFRIED AG	847,57	0,21	0,08
CONZZETA AG	1303,24	0,33	0,12	SIKA AG	9613,12	2,40	0,90
DÄTWYLER AG	1729,47	0,43	0,16	SONOVA AG	7852,11	1,96	0,74
DORMAKABA AG	2954,88	0,74	0,28	THE SWATCH GROUP AG	10066,89	2,52	0,95
DUFRY AG	6907,48	1,73	0,65	VALORA AG	1011,65	0,25	0,10
FORBO AG	2287,85	0,57	0,21	TOTAL	**400152,00**	**80,96**	**30,43**

Source: Yahoo (2019)

Figure 1: The development of stock prices (2006=100%)



Source: Yahoo (2019)

debt financing ends up outweighing the returns that the company generates on the debt through investment and business activities, stakeholders' share values may take a hit. If the cost of debt becomes too much for the company to handle, it can even lead to bankruptcy, which could leave shareholders with nothing since creditors are paid first during liquidation proceedings.

The following three ratios (L1, L2 and working capital) are connected with the liquidity of the company, where the cash liquidity indicator (L1) is calculated as the ratio between cash and short-term liabilities, on accounts and in cash. For businesses with normal traffic, it is recommended that the value of this indicator fluctuates between ten and twenty percent, sometimes it is advisable that this value does not fall below twenty percent. As this ratio only relates to so-called financial assets, its results need to be interpreted in other contexts. The Rapid Liquidity Indicator (L2) is the ratio between the swift current assets and short-term liabilities. The term current assets include current assets after deducting inventories and bad debts. This will increase the liquidity of short-term receivables. An optimal result is a 1:1 ratio.

Profitability of selected companies is measured by the return on assets ratio (ROA). ROA is defined as the ability to generate turnover from available capital and efficiently manage costs. Good profitability performance requires high turnover and low cost levels. Company total assets is the sum of its total liabilities and shareholder's equity. The ROA figure gives investors an idea of how effective the company is in converting the money it invests into net income.

Methods

According to Preis et al. (2012) or Glezakos et al. (2012), the Pearson correlation coefficient is used to examine the relationship between the development of the selected variables. The calculation of the Pearson correlation coefficient (Brooks, 2002) is then the following:

$$r_{xy} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{(n-1)s_x s_y} \quad (1)$$

Where x and y are the sample means of X and Y, and sx and sy are the corrected sample standard deviations of X and Y. The Pearson correlation is +1 in the case of a perfect direct linear relationship, −1 in the case of a perfect inverse linear relationship, and values in the open interval (−1, 1) indicating the degree of linear dependence between the variables. The closer the coefficient is to

Table 2: The Characteristics of the Selected Variables

Measure	Price	DE	L1	L2	ROA
Mean	268.2874	1.3226	0.4722	1.3138	0.0896
Median	128.2492	1.2277	0.3750	1.1603	0.0915
Maximum	3412.333	6.8049	2.4076	3.3846	0.2658
Minimum	4.874167	0.1784	0.0062	0.1102	-0.2182
Std. Dev.	429.3887	0.9214	0.3884	0.6532	0.0655

Source: Authors´calculation

either −1 or 1, the stronger the correlation between the variables.

In order to determine the causal relationship between stock prices and economic factors, a generalized method of moment's regression analysis will be used. This analysis is appropriate to use according to studies by Fleming (1998), Huang and Masulis (2003) or Hansen (1982). Hansen (1982) is an author of a theory based on a short time series used and irregular observations. The relationship between the selected financial indicators related to the structure of the sources of financing and the solvency of the enterprises can be expressed using the following equation (Brooks, 2002):

$$L_{it} = \alpha_1 + \beta_1 * \Delta L_{it-1} + \beta_2 * X_{1it} + \\ + \beta_3 * X_{2it} + \cdots + \beta_n * X_{nit} + \varepsilon_{it}, \quad (2)$$

where L_{it} represents the dependent variable (stock prices), ΔL_{it-1} is an explanatory variable representing the delayed L value of the previous year, Xnit includes explanatory variables for which selected financial indicators related to the structure of sources of financing are considered to have an effect on the solvency of enterprises. The ε_{it} character represents the residual component of the model within the GMM. For the robustness of the model, the Sargan / Hansen J- test is used.

Results

The basic relationship between stock price developments and selected financial ratios is captured in the correlation analysis in Table 3. A high correlation between variables could result in distorted results in the subsequent regression analysis and, therefore, in the case of multi-collinearity; correlation greater than 0.85, such variables have been removed. According to the results of the correlation analysis, all variables are suitable for observation for regression analysis. The highest correlation is reached by the variables L1 and L2, but this coefficient is even lower than 0.85.

The statistically significant correlation between selected variables was confirmed between stock prices and L1, L2 and ROA. The positive relation between the explained variable and the explanatory reaches maximum values around 0.13, so this relation can be described as very low. The correlation analysis of the explanatory variables serves in particular to determine the possible occurrence of multi-collinearity.

Pearson's correlation coefficient captures the relationship between two processes or quantities. If one of them changes, the second and vice versa change. If there is a statistically significant correlation between the two processes, it is likely that they depend on one another, but it cannot be concluded that one of them has to be the cause and the second consequence. This correlation does not allow a decision because the correlation does not imply causality. For this reason, correlation should be supplemented by regression analysis. For the purposes of this study, the GMM regression method was used.

The results shown in Table 4 describe a statistically significant relationship between all analyzed independent variables and stock prices, based on the results of t-statistics and probability, the zero hypothesis on statistical imbalances between variables was rejected. Compared to the correlation analysis, the resulting coefficients reach different ratios where regression analysis showed a negative relationship between DE and L2 and stock prices and a positive relationship between the L1 and ROA stock price lag and share prices. Based on the resulting coefficients, it can be argued that the lowest impact on stock prices is noted by the DE and, on the contrary, ROA has greatest impact. The robustness of the model proves the result of the J-statistics of Sargan Hansen's test, based on the probability outcome that the zero hypothesis on the robustness of the model cannot be rejected.

Table 3: Pearson Correlation Analyses

	PRICE	DE	L1	L2	ROA
PRICE	1	-0.0692	0.1262**	0.1271**	0.1362**
DE	-0.0692	1	-0.4435*	-0.4745*	-0.1341**
L1	0.1262**	-0.4435*	1	0.7219*	0.1895*
L2	0.1271**	-0.4745*	0.7219*	1	0.2143*
ROA	0.1362**	-0.1341**	0.1895*	0.2143*	1

Source: Authors´calculation

Table 4: The results of Altman Z-score – SME in the grey zone (1.2 <Z <2.9)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRICE(-1)	0.7438	0.0007	1114.042	0.0000
DE	-13.8896	1.9128	-7.2612	0.0000
L1	54.7053	5.3466	10.2318	0.0000
L2	-32.0799	4.0636	-7.8945	0.0000
ROA	429.0035	12.7518	33.6426	0.0000
Effects Specification				
Cross-section fixed (orthogonal deviations)				
Mean dependent var	-52.3024	J-statistic		22.184
S.E. of regression	121.3639	Prob(J-statistic)		0.5091

Source: Authors´calculation

Conclusions

The regression analysis results confirm the expected relationships in all cases. The negative relationship between stock prices and the debt to equity ratio points to the fact that the increase in debt to equity ratios generally means that the company has been aggressive in financing its growth with debt. Aggressive leveraging practices are often associated with high levels of risk, and the intrinsic value of shares decreases. In the case of Swiss companies according to panel regression, the change in the DE ratio per unit will reduce the share price by 13 units. The resulting relationship between L1 liquidity and stock prices confirms the hypothesis that the growth of the L1 and thus the increase in financial assets or the reduction of short-term liabilities will be reflected in the rise in stock prices. According to the resulting coefficient, it can be argued that with the growth of the L1 indicator per unit, the share price will increase by 54.7 units. On the other hand, the resulting relationship between L2 and stock prices is negative when the liquidity indicator was negatively affected by the receivables of companies with higher receivables declining the current value of shares where the non-payment of the receivable is related to the cost of its recovery.

The biggest impact on stock prices was demonstrated by the return on assets indicator, whereby the more profitable the company is, the abler it is to pay dividends. The company's growing profitability is therefore positively reflected in the total value of the company and hence in the share prices. The professional, scientific and technical services sector in Switzerland is one of the most important sectors of the economy, and thus the high resultant coefficient is a positive effect, with a unit price increase of 429 units.

The aim of this study was to determine the effect of microeconomic factors on the price of the listed Swiss Exchange companies. Without the information provided by financial analysis, no investor in the market will last long. The financial indicators include all the information needed for profitable investment in equities. Financial ratios have been used for the analysis. The relationship between the observed variables is explored using panel regression analysis. The generalized method of moments (GMM) for constructing a regression model is used. The sample period of the dataset is composed of annual data from 2006 to 2015. In total, 29 companies have been analysed, with a market capitalization of 80% of the total market capitalization and 30% of the total market capitalization.

Based on the literature review, the debt ratio ratios, liquidity ratios L1 and L2, and return on assets were selected. According to the literature review and economic theory, the negative relationship between debt to equity ratio and stock prices was expected, as was the positive relationship between profitability and stock prices, and the vague liquidity relationship with stock prices, in particular, and the expected impact of the equity capital on stock prices. The resulting correlation coefficient values, and in particular the GMM regression method, have confirmed these expected relationships. The largest impact on stock prices was demonstrated for the ROA.

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