

INTERDEPENDANCE OF ACCOUNTING DATA AND STOCK PRICES ON THE CAPITAL MARKET: “PLIVA” CASE STUDY²

ABSTRACT

The issue of stock market usefulness is, in fact, related to the specific disclosure environment prevailing in a country. Croatian capital market is underdeveloped and has limited significance in the financial system. This paper deals with the usefulness of financial statement information and it is organized in the following way: in the first part we give a brief overview of capital markets in transition economies, history and regulation of the stock market in Croatia, with particular focus on the Zagreb Stock Exchange. Then, we enumerate the data collection procedure and describe the methodology used to test our hypothesis. We examine the information content of annual earnings announcements through its impact on the stock price movement in the case of Pliva's ordinary shares, listed on the Quotation I of the Zagreb Stock Exchange. Finally, at the end of the paper we discuss the results and drew conclusions. The evidence suggests that annual earnings announcements made by Pliva convey new and material information to stock market investors, which is reflected in significant changes in stock return.

Key words: capital market, accounting data, earnings, stock return, stock price

1. Introduction

This paper deals with the usefulness of financial statement information (earnings) which has been an issue of continuing controversy. One group of users (e.g. accountants, managers and analysts) find this information very important, especially for security valuation. Another group of users, consisting mostly of academics, questions its usefulness. The latter argue that financial statement numbers are subject to rather arbitrary measurement practices and explain only a small fraction of the stock return variation. Studies on the information content of annual earnings announcements

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have primarily been focused on developed financial markets. Ball & Brown study (1968) established the claim that annual earnings announcements convey information to the stock markets in the developed countries. However, very few studies have assessed the information content of earnings announcements in developing markets in transitional countries.

The paper is organized in the following way: in the first part we gave a brief overview of capital markets in transition economies, and history and regulation of stock market in Croatia, with particular focus on the Zagreb Stock Exchange. Then, we enumerated the data collection procedure and described the methodology used to test our hypothesis. Finally, at the end of the paper we discussed the results and made conclusions.

2. Capital markets in transition economies

Development of the financial system and institutions, especially of capital markets, is a key component of transition from planned to market economy in transitional countries. In fact, functioning banks and stock markets were virtually non-existent at the outset of reforms in the early 1990s. At that time, liberalization of financial services and privatization gave rise to over-abundance of banks, many of which continued, either openly or covertly, to finance debt-ridden state-owned enterprises (Slavova, 2000). The large-scale privatization that took place caused several problems (Christoffersen, Slok, 2000). First, it was unrealistic to expect the stock market to provide liquidity and access to capital for such a large number of companies. Second, capital markets were liberalized before the establishment of all necessary institutions and the creation of the institutional infrastructure. It also caused problems with the transparency of share registration and the ability to transfer ownership. As a result, the capital markets in transition economies are still underdeveloped and non-efficient. For example, empirical results of Slovenian capital market's efficiency (Deželan, 1999) show that stock returns in less developed capital markets are extraordinarily predictable and loosely correlated to returns in developed capital markets.

3. Capital market in Croatia

The beginning of organized Capital Market in Croatia is connected with the establishment of the Zagreb Stock & Commodities Exchange in 1918³. It was the central Croatian trading institution for trading commodities, securities, foreign exchange, precious metals and coins. Trading stocks was abandoned and trading commodities was restricted in 1931. The Zagreb Stock and Commodities Exchange continued to operate as a commodities exchange until the end of World War II. The communist regime, that seized power in 1945, closed down the Zagreb Stock and Commodities Exchange in 1946 and confiscated its property. Forty five years later, with the crash of communism in 1991, a group of banks and insurance companies gathered to revive the stock exchange in Croatia, and establish the Zagreb Stock Exchange.

³ <http://www.zse.hr/history.html>

Today, capital market is still underdeveloped and has limited significance in the financial system. There are two organized exchanges: the Zagreb Stock Exchange and the Varaždin Stock Exchange. The Varaždin's market was transformed from the Over-the-Counter Market to Stock Exchange at the beginning of this year. The Zagreb Stock Exchange (ZSE), established as a non-profit institution, is the leading stock and debt securities trading institution in Croatia, with three tiers (ZSE, 2000). The Quotation I follows the Rules of the London Stock Exchange. It requires three years of audited financial statements, a free float of at least twenty-five percent of the share capital and the publication of a prospectus. The Quotation II requires one year of audited financial statements, a minimum free float of ten percent and the publication of a prospectus. The Quotation TN requires only one year of audited statements and no prospectus. Only three joint stock companies are listed on the Quotation I of the ZSE (two of them are also listed on the SEAQ segment of the London Stock Exchange). The securities of a further 61 joint stock companies are listed on the third tier, Quotation TN, which has a very low level of disclosure and listing requirements. On December 31, 2002 the market capitalization of the ZSE was 38,4 billion HRK or 5.66 billion EUR (ZSE, 2002).

3.1. Financial reporting in capital market in Croatia

Not only are the standards of preparation and reporting of financial statements formulated by the Accounting Law, but also by the Securities Act and the rules of the stock exchange. Financial statements are audited, but companies often publish the abridged versions of their financial statements - the balance sheet and income statement with full audit report, omitting the not included cash flow statement or notes to financial statements.

Financial reporting matrix in Croatia is shown on the table below.

Table 1

Financial Reporting Matrix in Croatia
(Taken and adapted from World Bank, 2001)

| REQUIREMENTS ENTITIES | Accounting Law | International Accounting Standards | European Union Accounting Directives |
|-------------------------------|----------------|------------------------------------|--------------------------------------|
| Listed companies | Required | Required | Optional* |
| Other joint stock companies | Required | Required | Optional* |
| Banks | Required | Required | Optional* |
| Large limited companies | Required | Required | Optional* |
| Medium size limited companies | Required | Required | Optional* |
| Small limited companies | Required | Required | Optional* |

* Some parts of the Directives have been incorporated in the Accounting Law and are, therefore, required.

As we can see, the Accounting Law (1992) requires all companies to present IAS financial statements, although medium and small companies are relieved of some of the

audit and publication requirements. Furthermore, it requires all joint stock companies and all large and medium sized limited liability companies to publish their financial statements in a newspaper and to file those financial statements with the local registrar the Financial Agency (FINA). The Registrar is public and these statements are available to all interested parties paying the fee.

Croatia's new Securities Market Law was adopted in July 2002 and has replaced the previous Law on the Issuance and Sale of Securities. The new Law was issued to comply with IOSCO Principles and EU Directives and introduced clearer definitions of some familiar concepts. According to the provisions of this Law, companies with publicly issued securities have to publish financial accounts on a quarterly basis. The Croatian Securities Commission collects this data, but does not publicly announce it.

4. Development of hypothesis

It is important to stress that the difference in accounting and legal systems among countries, as well as capital market characteristics, affect the usefulness of financial statement disclosures. Due to the absence of other competing information sources and the low level of analysts' coverage, annual earnings announcements are expected to play an important role in Croatia. Therefore, the hypothesis is:

H₀ hypothesis Given event has no impact on the mean or variance of returns, which means that earnings announcements do not indeed convey information useful for the valuation of company's stock

H₁ hypothesis.... Given event has impact on the mean or variance of returns, which means that earnings announcements do indeed convey information useful for the valuation of company's stock.

In this paper we examined the information content of annual earnings announcements through its impact on the stock price movement in the case of Pliva's ordinary shares, listed in the Quotation I of the Zagreb Stock Exchange. We have chosen Pliva's ordinary shares, because the ZSE is a non liquid market with a limited number of actively traded stocks. In the observation period, this stock had an average of 43% of total market capitalization (57% in 1998, 54% in 1999, 44% in 2000, 30% in 2001 and 34% in the first half of 2002). The earnings announcements were compiled for period from year 1998 to year 2002 (corresponding to the earnings from 1997 to 2001). The daily official stock quotation list was obtained from the ZSE.

In this analysis, the focus is on examining the stock market reactions at the time of announcement of annual reports. The idea behind such analyses is the following: if new and material information is disclosed through announcements of these reports, the share prices have a tendency to change. On the other hand, if capital market already expects a certain amount of earnings, then the announcement of the expected information will not cause a change in the stock price. Three pieces of information are compiled: the date of the announcement, the actual announced earnings and a measure of the expected earnings.

A large number of studies in this area, including the Ball & Brown study (1968), use the residual approach to assess the information content of earnings announcements. Unlike developed countries like the USA and the UK, information on stock prices and other data are not available and earnings announcements are not available for extended periods of time. Due to this fact, we used the expectation model approach put forth by Benston (1967) and later refined by Gonedes (1971). In this model, the market expectation of annual earnings is measured by using a simple average of the past three years. This expectation model may be stated as:

$$EE_{it} = b_1 AE_{i,t-1} + b_2 AE_{i,t-2} + b_3 AE_{i,t-3}$$

where:

$$b_1 = b_2 = b_3 = 1/3$$

EE_{it} – expected annual earnings of company i in time period t

AE_{it} – annual earnings of company i made in time period t

In addition we had to specify the sampling interval, the event window and the estimation window that will be used to analyze the behaviour of stock returns. In this paper we set the sampling interval to one day, which means that daily stock return is used. Take into consideration the following event periods in order to examine the stock market reaction:

- “pre-event window”, starting 30 days prior to the earnings announcement date and ending 2 days prior to the annual earnings announcement,
- “event window”, starting the day before the announcement and ending the day after the announcement,
- “post-event window”, starting 2 days after the announcement and ending 10 days after the announcement.

The relatively long pre-event period should enable us to investigate if the earnings are anticipated well before the announcements. We expanded the event window from one to three days - the day of the announcement and the day before and after the announcement. This is done in order to capture the price effects of the announcement that occur directly before the stock market opens or after the stock market closes on the announcement day. The ten-day post-announcement period is selected to evaluate full and efficient adjustment of information released with these announcements.

For each announcement we used a 90 day trading period prior to the event window as the estimation window. It is typical for the estimation and the event window not to overlap, because it enables the estimators to set the parameters of the normal return model not influenced by the event-related returns.

The next step was to identify the normal and the abnormal returns. Following the model used by Fama, Fisher, Jensen and Roll (1969), it was assumed that there was a unique linear relationship between the market portfolio return and the return for each security (known also as continuously compounded return). We used the lognormal model to

calculate the normal return for security, which can be expressed by the following equation:

$$\ln(R_{it}) = \alpha_i + \beta_i \ln(R_{mt}) + \varepsilon_{it}$$

where:

R_{it} – return for security i in time period t

R_{mt} – market portfolio return measured as return on market index CROBEX

α_i, β_i - security i specific and time-independent parameters

ε_{it} – zero mean disturbance term, with $E(\varepsilon_{it}) = 0$; $\text{Var}(\varepsilon_{it}) = \sigma_{\varepsilon_i}^2$

With the parameter estimates for the normal performance, the abnormal returns can be calculated to appraise the impact of the event. The abnormal return is the actual ex post return of the stock over the event window, minus the normal of the company return over the event window (Campbell, Lo, MacKinlay, 1997).

$$AR_{it} = \ln(R_{it}) - (\alpha_i + \beta_i \ln(R_{mt}))$$

where:

AR_{it} - abnormal return for security i in time period t

R_{it} – return for security i in time period t

R_{mt} - market portfolio return measured as return on market index CROBEX

α_i, β_i - regression parameters

Using this methodology implicitly assumes that the event is exogenous with the respect to the change in the market value of the security.

Finally, the abnormal return observations must be aggregated in order to draw overall inferences for the event. Cumulative abnormal return implicates aggregation through time and we used it to accommodate multiple sampling intervals within the event window (Campbell, Lo, MacKinlay, 1997).

$$CAR_{it} = \alpha_i + \beta_i UC_{it}$$

where:

CAR_{it} – cumulative abnormal return for security i in time period t

α_i, β_i - regression parameters

UC_{it} – unexpected changes in earnings for security i in time period t

5. Testing and results

In order to examine the impact of the earnings announcement on the stock price, we assigned each announcement to one of the three categories: good news, no news or bad news. We categorized each announcement using the deviation of the actual earnings from the expected earnings. If the actual earnings exceed the expected ones by more than 2,5%, the announcement is designated as good news, and if the actual earnings are 2,5% less than expected, the announcement is designated as bad news. Those announcements where the actual earnings are centered in the 5% range around the expected earnings designated as no news.

Results are shown in the table below:

Table 2
Categorization of announced earnings according to value of Actual earnings/Expected earnings ratio

| RATIO GREATER THAN -2,5% (BAD NEWS) | RATIO BETWEEN -2,5% AND +2,5% (NO NEWS) | RATIO GREATER THAN +2,5% (GOOD NEWS) |
|--|--|---|
| | | Annual report for year 1997 |
| | | Annual report for year 1998 |
| | | Annual report for year 1999 |
| | | Annual report for year 2000 |
| | | Annual report for year 2001 |

The next step was to calculate the normal return. The normal return is defined as the expected return in case it does not occur. We used the market model to calculate the normal return of security. This model assumes a stable linear relation between the return of security and the return of the market portfolio.

The following table shows descriptive statistics for the model:

Table 3

Descriptive statistics

| DESCRIPTIVE STATISTICS/YEAR | 1998 | 1999 | 2000 | 2001 | 2002 |
|-----------------------------|----------|----------|----------|----------|---------|
| Mean | 0.00131 | -0.00332 | -0.00053 | -0.00317 | 0.00182 |
| Standard Error | 0.00255 | 0.00369 | 0.00219 | 0.00208 | 0.00271 |
| Median | 0.00051 | -0.00628 | -0.00122 | -0.00151 | 0.00088 |
| Standard Deviation | 0.01442 | 0.02213 | 0.01348 | 0.01317 | 0.01733 |
| Sample Variance | 0.00021 | 0.00049 | 0.00018 | 0.00017 | 0.0003 |
| Kurtosis | 1.7827 | 0.88729 | 0.55828 | -0.80883 | 2.62131 |
| Skewness | -0.34217 | 0.36443 | 0.66194 | -0.1497 | 0.57688 |
| Minimum | -0.04172 | -0.05629 | -0.02195 | -0.02707 | -0.0374 |
| Maximum | 0.03376 | 0.05431 | 0.03642 | 0.02482 | 0.06056 |
| Sum | 0.04203 | -0.11935 | -0.02012 | -0.12687 | 0.07 |
| Observations | 32 | 36 | 38 | 40 | 41 |

The model is estimated by using the ordinary least squares regression on the daily stock returns. We calculated the standard error to measure the precision of the regression coefficient β . As we can see, standard error is higher than mean, what indicates a low representative of the regression model, caused mostly by an extra small sample. Also, we can point out that the lognormal model we used is not consistent with all the properties of historical stock returns (Campbell, Lo, MacKinlay, 1997). At short horizons, historical returns show weak evidence of skewness and strong evidence of kurtosis. For example, sample estimates of skewness for daily US stock returns tend to be close to zero or positive for individual stocks, and sample estimates of kurtosis for daily US stock returns are large and positive for individual stocks. However, the characteristics of the Croatian capital market (non-liquid, volatile) show deviation from the presented pattern by unusually high values of skewness and negative value of kurtosis.

With the parameter estimates for the normal performance model, the abnormal returns can be calculated. The abnormal return is actually ex post return of the security over the event window minus the normal return of the firm over the event window. This implicitly assumes that abnormal returns are caused by the unexpected changes in company earnings.

Results are shown in the table below.

Table 4
 Summary output for regression model

| SUMMARY OUTPUT/YEAR | 1998 | 1999 | 2000 | 2001 | 2002 |
|-----------------------------------|----------|------------|-----------|-----------|-----------|
| Intercept (coefficient α) | 0.00271 | 0.00057 | -0.00122 | -0.00384 | 0.00224 |
| Coefficient β | 0.9954 | 1.08087 | 0.56188 | 0.85299 | 1.37807 |
| T-test* | 6.93695* | 10.99403* | 6.61063* | 6.15029* | 6.00176* |
| ANOVA (F-test)* | 48.1213* | 120.86875* | 43.70048* | 37.82602* | 36.02106* |
| Correlation coefficient | 0.78485 | 0.88315 | 0.74048 | 0.7063 | 0.69293 |
| R square | 0.61598 | 0.77996 | 0.54831 | 0.49885 | 0.48015 |
| Adjusted R square | 0.60318 | 0.774 | 0.53576 | 0.48566 | 0.46682 |
| Standard error | 0.01452 | 0.01415 | 0.01163 | 0.01327 | 0.01747 |
| Observations | 32 | 36 | 38 | 40 | 41 |
| Durbin-Watson test* | 2.46045* | 3.07479* | 2.99724* | 2.05133* | 2.01* |

* Statistically significant at 0.05 level of significance

First, we tested the interdependency of unexpected changes in announced earnings with the abnormal return by using Student t-test at 0.05 level of significance on value of regression coefficient β . This coefficient is also known as the response coefficient. The presented results show that the variable of unexpected changes in the announced earnings is statically significant in all the years. Coefficient β has the value of 1.0; 1.08; 0.56; 0.85; 1.38 in the observed period, which is the level of change in return caused by the unexpected changes in the announced earnings of 1%. According to this, we concluded that earnings are significantly useful to stock market investors due to do of significantly positive value of the response coefficient.

In addition, we examined if any of the variables belonging to the model is included in the error term and needs to be culled out from it and introduced in its own right as an explanatory variable by using Durbin-Watson test of correlation in the residuals. As the computed values for each year are greater than table d_v value, it means that there is no evidence of positive first-order serial correlation in the residuals.

Finally, the usefulness of announcing accounting data can be tested in each period by calculating the cumulative abnormal return, and testing it by Student t-test at 0.05 level of significance.

Results are shown in the table below.

Table 5

Cumulative abnormal return

| TRADING PERIOD / YEAR | | 1998 | 1999 | 2000 | 2001 | 2002 |
|------------------------|---------|-----------|----------|----------|----------|----------|
| FROM -30 TO -2 DAYS | CAR | 0.01534 | -0.10003 | -0.03542 | -0.13263 | 0.00733 |
| | T-test* | 0.90874* | 0.53225 | 0.79817* | 0.20594 | 0.95849* |
| FROM -1 TO +1 DAYS | CAR | 0.01247 | 0.05153 | -0.02112 | 0.04815 | 0.00944 |
| | T-test* | 0.72870* | 0.45670 | 0.65175* | 0.44325 | 0.88000* |
| FROM +1 TO +10 DAYS | CAR | 0.01422 | -0.07085 | 0.03642 | -0.04239 | 0.05795 |
| | T-test* | 0.84017 * | 0.36658 | 0.56369 | 0.52011 | 0.59132 |

* Statistically significant at 0.05 level of significance

As we can see from the presented results, unexpected annual earnings caused the highest abnormal stock return in the three-day announcement period. Stock return behaviour before and after earnings announcements is also analyzed. There seems to be a significant pre-announcement increase in the stock price, which is related to the positive earnings surprise. These cumulative stock returns are mostly statistically significant. In the post-announcement period, as it seems significant increase in the stock price, and this cumulative stock returns are not statistically significant.

It is interesting to point out that the results for the year 2000 have the opposite direction (negative stock return in the pre-announcement and announcement period, and positive stock return in the post-announcement period). These findings indicate significant influence of the crisis in the world's capital market in August 2000.

Therefore, evidence suggests that annual earnings announcements have material information content and are in support of the alternative hypothesis that earnings announcements have material information content conveying information useful to the valuation of company's stocks and that this generate large stock market reaction.

6. Concluding remarks

Studies on the information content of accounting data have primarily been focused on developed financial markets. Ball & Brown (1968) empirically proved the correlation between accounting data and stock prices and that annual earnings announcement convey information to investors on the stock markets. However, very few studies have assessed the information content of accounting data in countries in transition. As far as we know, this paper presents the first attempt of examining the cross-sectional variation in the stock price and earnings announcements in Croatia. The issue of stock market usefulness is, in fact, related to the specific disclosure environment prevailing in a country. Croatian capital market is underdeveloped and has limited significance in the financial system. A great number of securities are listed on the tier with very low level of disclosure and listing requirements. This study could not be performed without

efficient market hypothesis, despite the inefficiency of the Croatian capital market as shown by the above mentioned facts.

In this paper we examined the information content of annual earnings announcements through its impact on the stock price movement in the case of Pliva's ordinary shares, listed in the Quotation I of the Zagreb Stock Exchange. We chose Pliva's ordinary shares, because the ZSE is a non liquid market with limited number of actively traded stocks. In the observation period, this stock had an average of 43% of total market capitalization. The evidence suggests that annual earnings announcements made by Pliva convey new and material information to stock market investors, which is reflected in significant changes in the stock return. Therefore, we accept the alternative hypothesis that earnings announcement have material information content conveying information useful for the valuation of the company's stock and thereby generate large stock market reaction.

The results from this study should be interpreted with the following limitations in mind: data availability constraints limited by the time horizon and the extra small sample size. In addition, the study uses a relatively simple model to generate earnings expectations. Finally, the findings indicate anticipation of earnings announcements and probably the existence of insider information. All this is consistent with the fact that the information environment in Croatia is relatively poor compared to that in developed countries.

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MEĐUZAVISNOST RAČUNOVODSTVENIH INFORMACIJA I CIJENA NA TRŽIŠTU KAPITALA: "PLIVA" CASE STUDY

SAŽETAK

Empirijska istraživanja su pokazala da razlike u računovodstvenom i regulativnom sustavu, kao i karakteristike tržišta kapitala u različitim zemljama odražavaju korisnost informacija objavljenih u financijskim izvještajima. Hrvatska ima nerazvijeno tržište kapitala, čija je uloga u financijskom sustavu zemlje malena. Zbog nedostatka ostalih izvora konkurentnih informacija, godišnji financijski izvještaji poduzeća predstavljaju jedan od najvažnijih izvora informacija. Cilj ovog rada je ispitati korisnost informacija iz financijskih izvještaja za sudionike na tržištu kapitala. Rad je podijeljen u tri dijela. U prvom dijelu je dan kratak prikaz razvoja tržišta kapitala u tranzicijskim zemljama, s posebnim osvrtom na Hrvatsku, te njegov regulativni okvir. U drugom dijelu je specificirana korištena metodologija, te postavljena hipoteza, kako bismo ispitati informacijsku korisnost podataka o zaradama koji su sadržani u objavljenim godišnjim izvještajima. Njihova korisnost se ispituje kroz utjecaj na kretanja cijena na tržištu kapitala na primjeru redovnih dionica Plive koje kotiraju u Kotaciji I Zagrebačke burze. Konačno, nakon rasprave o dobivenim rezultatima, izvedeni su određeni zaključci. Empirijsko istraživanje je pokazalo da objave godišnjih rezultata poslovanja Plive predstavlja značajnu informaciju za sudionike na tržištu kapitala, što se očituje u statistički značajnim promjenama u kretanju cijena dionica, odnosno povrata na dionicu.

Ključne riječi: *tržište kapitala, računovodstvene informacije, zarade, povrat na dionicu, cijena dionice*

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