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DIPLOMOVÁ PRÁCE

**The impact of dividend policy
on firm value**

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Prohlášení

Prohlašuji, že jsem diplomovou práci vypracovala samostatně a použila pouze uvedené prameny a literaturu.

Declaration

Hereby I declare that I compiled this master thesis independently, using only the listed literature and resources.

Prague, 10 January 2009

Jana Říhová

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A special word of thanks belongs of course to my family and friends for their patience throughout the process of writing.

ABSTRACT

This thesis is focused on the dividend policy in the Czech Republic. We describe the basic about dividends as types of dividends, process of declaration and payments, dividend-paying methods, determinants which can influence the dividends and so on. The main part is devoted to the issue of dividend policy in the Czech Republic and its impact on the firm value. We use the event studies, based on observing the abnormal returns to shareholders around the record date. Then we apply regression of abnormal returns on relevant explanatory variables. And we also make an analysis of some of explanatory variables, as volume and dividend yield. Finally, we also shortly mention the share repurchase, the alternative to the dividend payout.

ABSTRAKT

Tato práce se zabývá dividendovou politikou v České republice. V první části práce jsou popsány základní pojmy které s dividendami souvisí, jako například typy dividend, významné dny které se týkají odsouhlasení a vyplácení dividend, metody vyplácení dividend, vlivy které ovlivňují dividendovou politiku, atd. Hlavní část práce je věnována vlivu dividend na hodnotu firmy. Využili jsme event study, založenou na pozorování abnormálních výnosů kolem rozhodného dne. Pak jsme provedli regresi abnormálních výnosů oproti relevantním vysvětlujícím proměnným a také hlubší analýzu dvou vysvětlujících proměnných a to objemu obchodování a výnosu dividend. Na konci práce jsme krátce zmínili i zpětný odkup akcií, což je alternativa kterou firmy využívají místo vyplácení dividend.

TEZE DIPLOMOVÉ PRÁCE

Termín magisterské zkoušky: zimní semestr 2008/2009
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Název práce: **The impact of dividend policy on firm value**

Stručná charakteristika tématu a hypotézy:

This thesis considers corporate finance as a major source for company's welfare, especially dividend policy. Each firm has to decide whether to pay out dividend or reinvest the money into the business. The purpose of this thesis is to investigate basic questions which pertain to dividends: What is the conceptual nature of a stock dividend? Why are stock dividends issued by corporate managements? Or why the company decide to follow either the high or low dividend?

But the main question of this thesis is how manager's dividend policy decisions affect common stock share price? I am going to verify the hypothesis that there is some dependence between dividend payout and firm value and if the dependence is negative or positive. I would like to address this issue by selection of the most appropriate model for the Czech Republic. I am going to use the econometric model to find some dependence between portfolio return and income distributed among shareholders. Eventually I want to try to improve the model to fit well the situation on the Czech market.

Metody práce:

This thesis deals with dividend policy and applies theoretical as well as empirical findings. The first part introduces dividend policy from theoretical point of view using available literature. The second part of my thesis (empirical one) is the most important. My task is to model the profitability of the firm and relate it to dividend policy in the Czech Republic. I am going to compile econometric model with using historical data to model the situation.

Předpokládaná osnova práce:

- Introduction
- Literature review
- Methodology
- Data description
- Model
- Statistical result
- Conclusion

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*"Price is what you pay. Value is what you get."
Warren Buffett*

1. INTRODUCTION

The decision which theme should be interesting for Master's Thesis was not easy to make. I want to write about something which is interesting especially for me and I want to write about the Czech Republic. And what can be more interesting than the determinants which influence the firm's value. Why some firms become very successful and expensive and some of them become bankrupt? There are many factors which influence the firm value and I don't want to mention them now, but I want to concentrate on one of them and I choose dividend policy. Dividend policy together with investment decisions and with choice of optimal financial resources structure forms the financial management basis of every company. I am not sure if my decision to write about dividends in the Czech Republic was good, due to the short period when dividends in our country exist. Some people told me to try to write about dividends in the USA. Despite the large body of theoretical and empirical research on dividend policy in the USA the Czech dividend market is not well known. I know that dividends in America have longer tradition and it would be easier to find some data about this country, but I decide to write about our small but beautiful country. I hope that we will see at the end of this paper, that it was a good decision. And I hope that I find some interesting conclusion, or at least some conclusion.

Our thesis is focused on the dividend policy, especially on the influence of dividend on price of share. The behaviour of stock prices around ex-dividend date is one indicator of the relative valuation of dividends versus capital gains, a critical issue in corporate dividend policy. That is the reason why I try to answer this question.

This thesis is structured in the following way. The following second chapter brings an overview of basic ideas about dividends, which are important for identification with dividends. It characterizes types of dividends,

dividend-paying methods, definitions of important days for dividends, which we use in our following work. We try to answer the questions why firms pay dividends and if it is better to pay out high or low dividend and we shouldn't forget to find the factors which can influence dividend policy. And least but not last we skim through development of the dividend policy.

In chapter 3 we implement empirical analysis of stock price behaviour around record date in the Czech Republic with using of our knowledge acquiring during study. We apply the event study methodology, which is based on observing the abnormal returns to shareholders around the significant day. In the first part we provide theoretical background of event study. Further, we present data sample, methodology and results of our own event study. In the second part we employ regression analyses with using OLS (ordinary least squares) method. We regress abnormal returns against relevant explanatory variables discussed below. But before the regression we execute short analysis of explanatory variables, especially volume and dividend yield.

Semi-final short part is applied to alternative to the dividend, what is share repurchase, a possibility for corporations to buy back their own shares. We concentrate on description of advantage of share repurchase against dividend payout.

And of course that we can not forget to summary our results and conclusions in the last short part.

*“Change is the investor's only certainty. “
T. R. Price, Jr.*

2. THEORY ABOUT DIVIDENDS

2.1. THE BASICS ABOUT DIVIDENDS

Every company that earn a profit is faced with decision which possibility is the best for it. It can be payout a portion of the profit out to shareholders (pay dividends), reinvest profit in the business through expansion, debt reduction or share repurchase or both. Every strategy can be favourable depending mainly on the preferences of the managers of company.

Main task is to write about the first possibility, about dividends. Many investors see dividends as "money for nothing"¹, but the implications surrounding paying and receiving dividends can mean a lot of work for both the company and the investor. There are two definitions of dividend.

- 1) Dividend is a payment, out of profits or reserves available for this purpose, which is divided among the investors in a company (shareholders).
- 2) Dividend is a part of disbursed share of the earnings fall on one stock. These definitions came from the word dividend (dělenec) - also the payment is divided between the investors.

In the Czech Republic, the dividend is defined in commercial code as a share of company earnings which was (depending on income trading) determine to division by general meeting. So it is a claim on a share of company's earnings per share.

2.1.1. TYPES OF DIVIDENDS

There exist some types of dividends we can differentiate among four main viewpoints:

¹ All you have to do is buy shares in the right company and you'll receive some of its earnings.

Variety of share on which is dividend paid

We can distinguish between **Common** (primary, ordinary, current) dividend for common share and **Preference** (preferred, priority) dividend which is distributed to the owner of priority shares. In the Czech Republic the common dividend are most popular, only small numbers of companies paid preferred dividends.

Form of dividend payment

Form which can dividend arise are **Cash Dividends** which are most frequent. They are paid out of a company's profits (out of accumulated surplus or current income or both) to the owners of the business so the payment results in cash outflow from the firm. The disadvantage of cash dividend can be the adequate firm cash resources. Dividend payments, whether they are cash or stock, reduce retained earnings by the total amount of the dividend. In the case of a cash dividend, the money is transferred to a liability account called dividends payable. This liability is removed when the company actually makes the payment on the dividend payment date.²

Second most frequent form of dividend payment is **Stock Dividends**. The share of earnings is paid in the form of a new company shares to the existing shareholders in proportion to their holdings of equity share capital of the company. This is next to cash dividend in respect of its popularity. The advantage is that there is no diminishing of cash. There is also on one hand decreasing basic of valuation the market price of share and on the other hand the share on the company's property of the shareholders stays the same and there are an increasing number of shareholders shares. Unlike the market effect of cash dividends, no real resistance against ex-dividend market price decline can be attributed to stock dividends. The market prices of stock-dividend shares reflect the fact that more shares of ownership represent the same total corporate equity. Stock dividends resemble stock

² www.investopedia.com

split. But stock dividends don't reduce face value of shares.³

There exist also Bond and Property dividends, but their appearance is not very frequent. A **Bond Dividend** is a type of liability dividend paid in the dividend payer's bonds. This can be a good solution for the companies which do not have sufficient funds to pay dividends in cash because purpose of bond dividend is postponement of payment of immediate dividend in cash. The bond holders get regular interest on their bonds besides payment of the bond money on the due date.

Property Dividends is when a company distributes property to shareholders instead of cash or stock. Property dividends can take the form of any item with tangible value, for instance cars, pencils, gold, silver⁴, and so on. Property dividends are recorded at market value on the declaration date. This is used by small companies with small number of shareholders.

In the Czech Republic the majority of companies pay cash dividend, few stock dividends and rarely bond or property dividends.

Regularity of dividend payment

If dividends are paid in regular time sequences, for instance one a year (typically for Europe) we are speaking about **Regular Dividends**.

In addition to regular dividends, there are times a company may pay a **Special one-time dividend** also known as superdividend. These ones are rare and can occur for a variety of reasons such as a major litigation win, the sale of a business, liquidation of an investment and so on. Due to the temporarily lower rates of taxation on dividends, there has been an increase in special dividends paid in recent years. There are times when these, special one-time dividends are classified as a return of capital. In essence, these payments are not a payout of the company's profits but instead a return of money shareholders has invested in the business. As a result, return of capital dividends is tax-free. Special one-time dividends sometimes offer an opportunity for arbitrage.

³ The study of Barker (1959) found that in contrast to cash dividends, there are no profit possibilities, on average, with respect to stock dividends at ex-dividend date.

⁴ As an example of property dividend can be one construction company in the Czech Republic, which consider dividend payment in a form of building panel.

Last dividend of bankrupt company which is paid before expiry is **Liquidating Dividends**. It presents remaining balance which stays after satisfaction of all companies obligation.

Interval of dividend payment

Dividends are paid on an annual or a quarterly basis. A vast majority of dividends in the Czech Republic are paid annually, in the USA are paid four times a year on a quarterly basis (total dividend = final dividend and interim dividends).

2.1.2. PROCESS OF DECLARATION AND PAYMENT

Dividends must be approved or declared by a company's Board of Directors (or general meeting of shareholders) each time they are paid. There are four important dates to remember regarding dividends.

The **Declaration date** is the day the Board of Director's announces their intention to pay a dividend. On this day, the company creates a liability on its books; it now owes the money to the stockholders. On the declaration date, the Board will also announce a date of record and a payment date.

Ex-dividend day is the day before which the stockholders must own shares to be eligible for receiving a dividend. A stock will usually begin trading ex-dividend or ex-rights a two business days before the date of record. Only the owners of the shares before that date will receive the dividend. If you purchased shares of the firm on or after the ex-dividend date, you would not receive its upcoming dividend payment; the investor from whom you purchased your shares would.

Date of record, set by the issuing company, is day on which an individual must own shares in order to be eligible to receive a declared dividend or capital gains distribution. The date is also used to set the ex-dividend date.

Last but not least is **Payment date**, the date the dividend will actually be given to the shareholders of company. Payment day follows

freeze, divided into dividend or used to another purpose, subsequently also in determination of level of dividend. The company should decide to follow either the high or low dividend method, it would use one of four main approaches: residual, stability, or a compromise between the two (so-called hybrid) and maintenance Stable (constant) dividend payout ratio.

Residual policy

Companies using the residual dividend policy choose to rely on internally generated equity to finance any new projects. As a result, dividend payments can come out of the residual or leftover equity only after all project capital requirements are met. In other words, a company should only pay dividends if it is unable to reinvest its cash at a higher rate than the shareholders (owners) of the business would be able to if the money was in their hands. These companies usually attempt to maintain balance in their debt-equity ratios before making any dividend distributions, which demonstrates that such a company decides upon dividends only if there is enough money leftover after all operating and expansion expenses are met. This policy is used by smaller or beginning companies with small number of shareholders, because the owners are usually also managers, so they have enough information to decide about new investments.

But the conclusion of Ang (1975) study was that the generally high coherence between dividends and earnings in most frequencies may also suggest that dividend policy may not be an entirely residual decision.

In the Czech Republic only 3% of addressed companies subordinate investment policy to dividend policy on the other hand 12,5% exercise a residual policy. 96,7 % of companies consider investment strategy as one from three most important places in creation their dividend policy. (Marek, 2000)

Stable policy

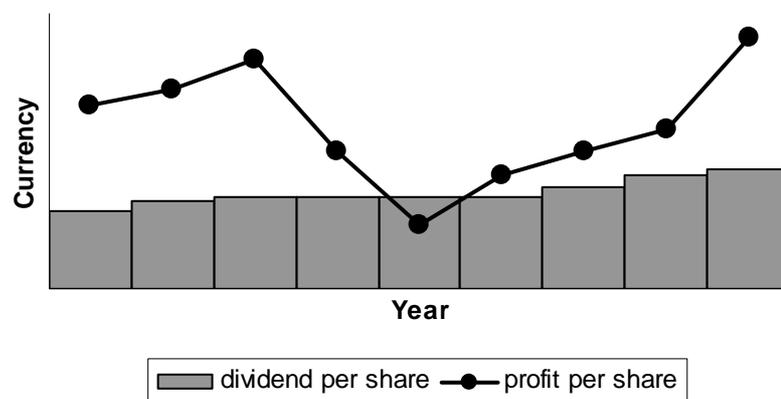
With the stability policy is meaning the consistency in the dividends payment. This policy comes from dividend-neutrality theory. Companies may choose a stable policy that sets constant dividend per share, constant

percentage or stable dividend plus extra dividend. The dividend payout ratio is chosen and shouldn't be getting over in long term.

In either case, the aim of the dividend stability policy is to reduce uncertainty for investors and to provide them with income; it is a sign of financial stability of the company. Increasing tendency of dividend is a signal about confidence of company's management in future favourable development. On the other hand, for companies is very embarrassing to cut dividends. The dangerous thing is once a stable dividend policy is adopted by a company, any adverse change in it may result in serious damage regarding the financial standing of the company in the mind of the investors. This type of policy is applicable in larger, older companies with higher numbers of shareholders, where arise agency problem, separation of company's owners and managers. The change of dividend means a good or bad signal about company's prosperity, so it is better to use stable dividend.

In the Czech Republic this policy was used by 70% of addressed companies. (Marek,2000)

Figure 1: Stable policy



Source: Gazda – Čábelka (2002), pp. 48

Hybrid policy

The final approach is a combination between the residual and stable dividend policy. Using this approach, companies tend to view the debt/equity ratio as a long-term rather than a short-term goal. In today's markets, this

approach is commonly used by companies that pay dividends. As these companies will generally experience business cycle fluctuations, they will generally have one set dividend, which is set as a relatively small portion of yearly income and can be easily maintained. On top of this set dividend, these companies will offer another extra dividend paid only when income exceeds general obtained levels.

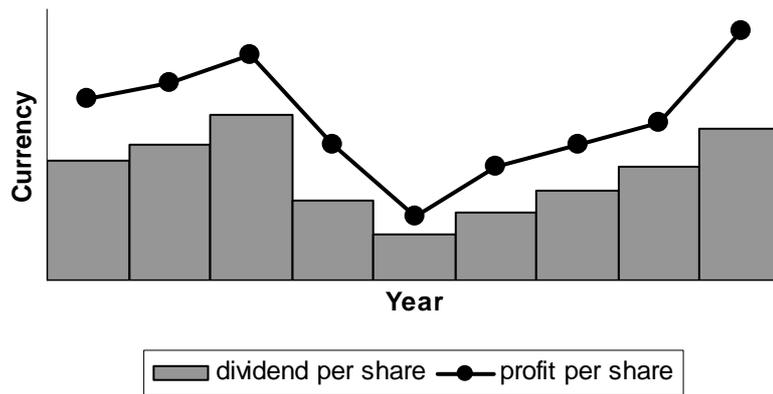
Stable (constant) dividend payout ratio policy

In recent years there was a hypothesis that corporate directors determine dividend payments by applying target payout ratios and related parameters to current and past earnings. The Dividend Payout Ratio⁷ (dividends paid divided by reported net income) is percentage of net income (diminishing by priority dividends) that is paid out in the form of dividend. That means that company decrease or increase a level of dividend on one share in dependence on development of net income on share. Its inverse, the retention ratio (the amount not paid out to shareholders in the form of dividends), can help project a growth of company. One reason for the acceptance of this view appears to be its success in predicting the behaviour of aggregate measures of dividends in time series regression analyses. On the other hand the doubt upon the target payout hypothesis are the frequent omission of regular cash dividends, which means that dividends cannot always be in some target proportion to earnings and the frequent use of extras, a cash dividend purposely distinguished from the regular quarterly dividend payment. Extras suggest, because of their temporary character, that increases in dividends are not always prompted by anticipated increase in earnings. (Michaelsen, 1966)

In the Czech Republic there was 40% of companies which determinate their dividend policy by dividend payout ratio in year 1995. The dividend ratio was mainly between 25 and 50%. (Marek, 2000)

⁷ We should also define the dividend yield. The dividend yield tells the investor how much he is earning on a common stock from the dividend alone based on the current market price. Dividend yield is calculated by dividing the actual or indicated annual dividend by the current price per share.

Figure 2: Stable dividend payout ratio



Source: Gazda J. – Čábelka J., 2002, pp. 49

In the Czech Republic the most frequent dividend-paying method was predominate passive residual policy with some elements of stability dividend policy. The main reason could be start-up phase of companies' life cycle. The companies need money primary for investments and how we know dividends negatively influence capital investment.

2.2. SHOULD COMPANIES PAY LOW OR HIGH DIVIDENDS?

One of the interesting questions is why the stock dividends are issued by corporate managements? Managements' objectives in issuing stock dividends were examined by means of a questionnaire by Sussman (1962) of the 81 corporations; approximately 76 % indicated that their primary objective was to conserve cash. Stock dividends were issued to maintain existing stockholder relations or to improve them. Dividend policy can be implied mainly by capital budget decision (need to finance investment – lower dividends) or by borrowing decision. Typically the companies that pay dividends are more stable and established, not "fast growers". Those still in the rapid growth phase of their life cycle tend to retain all the earnings and reinvest them into the business.⁸

⁸ www.investopedia.com

2.2.1. PROS AND CONS DIVIDENDS

Arguments against Dividends

Some financial analysts feel that the consideration of a dividend policy is irrelevant because investors have the ability to create "homemade" dividends. These analysts claim that this income is achieved by individuals adjusting their personal portfolio to reflect their own preferences. For example, investors looking for a steady stream of income are more likely to invest in bonds (whose interest payments don't change), rather than a dividend-paying stock (whose value can fluctuate). Because their interest payments won't change, those who own bonds don't care about a particular company's dividend policy.

The second argument claims that little to no dividend payout is more favourable for investors. Supporters of this policy point out that taxation on a dividend is higher than that on capital gain. The argument against dividends is based on the belief that a firm who reinvests funds (rather than pays it out as a dividend) will increase the value of the firm as a whole and consequently increase the market value of the stock. According to the proponents of the no-dividend policy, a company's alternatives to paying out excess cash as dividends are the following: undertaking more projects, repurchasing the company's own shares, acquiring new companies and profitable assets, and reinvesting in financial assets.⁹

Arguments for Dividends

Dividends provide certainty about the company's financial well being and are also attractive for investors looking to secure current income because dividends reduce uncertainty (capital gains are uncertain). Allen, Bernardo (2000) found, that firms attract more shareholders by paying out the dividends and moreover firms paying dividends perform better than otherwise equal non-dividend-paying firms.

Another advantage is that dividends can lower the price of the stock

⁹ www.investopedia.com

on a per-share basis this usually results in a large number of shares trading increase in the number of shareholders and increase liquidity (how fast an investor can turn his holdings into cash).¹⁰

Moreover, managements should opt for stock dividends over all other kinds. This will allow investors that want their earnings retained in the business (and not taxed) to hold on to the additional stock paid out to them. Investors that want current income, on the other hand, can sell the shares they receive from the stock dividend, pay the tax and pocket the cash - in essence, creating a “do-it-yourself” dividend.¹¹

The positive stock market response to dividend increases is also information content and wealth redistribution between stockholders and bondholders. Typically we find out that the bond price reaction to announcements of large dividend changes is opposite to the stock price reaction. (Dhillon - Johnson, 1994)

Dividends can also serve as a useful accounting technique to effect transfers of predetermined amounts of earned surplus to the capital and capital-surplus accounts, thus permanently capitalizing some of the earned surplus where technical considerations make this action desirable. (Barker, 1959)

In some countries preference of corporations for dividend over capital gains because of favourable tax treatment corporations receive on dividend income (corporate trader hypothesis). (Michaely, 1989) Shefrin and Statman (1984), however, suggest that preferences for dividends over capital gains may exist for no tax reasons such as self-control or a desire to segregate gains and losses.

2.2.2. DETERMINANTS OF CORPORATE DIVIDEND POLICIES

During the first part of the twentieth century, dividends were the primary reason investors purchased stock. It was literally said on Wall Street, “the purpose of a company is to pay dividends”. It was connected with the

¹⁰ beginnersinvest.about.com

¹¹ beginnersinvest.about.com

opinion that the higher dividends (as the percent of the gain) the higher market price of share, ceteris paribus.¹² Today's investor looks to dividends as a source of increase. Microsoft, for example, did not pay a dividend until it had already become a \$350 billion company, long after making the company's founders and long-term shareholders multi-millionaires or billionaires.¹³

It is not easy to fully understand the determinants of corporate dividend policies by deducing them from the dividend record. These determinants are many, varied, and changing. The main determinants depend upon your personality, financial and legislation circumstances and the business itself.

Legislation Factors (Marek, 2005)

There exist lot of legislation factors which influence dividend policy. Between most considerable determinants pertain limitation of dispensable financial sources for dividend collection – financial sources which the company can use for dividend payment (in most countries net income of this year and retained income from last years), Assessment Rules of dividend gain, Definition of illegal dividend, Mechanisms to save rights of minority shareholders, Dividend taxation – more about dividend taxation is undermentioned and difference between Common Law and Civil Law - higher dividends are paid by corporations in countries with strong legal protection of minority shareholders, such as those countries with codes based on Common Law rather than Civil Law.

Financial Factors

They influence maximum dividend value which can be paid. On active it is cash and on passive it is height of available financial sources for dividend collection. If the company has profitable projects and it is costly to raise

¹² The early empirical papers support this with finding a big dependence between dividend payout ratio and price-earning ratio.

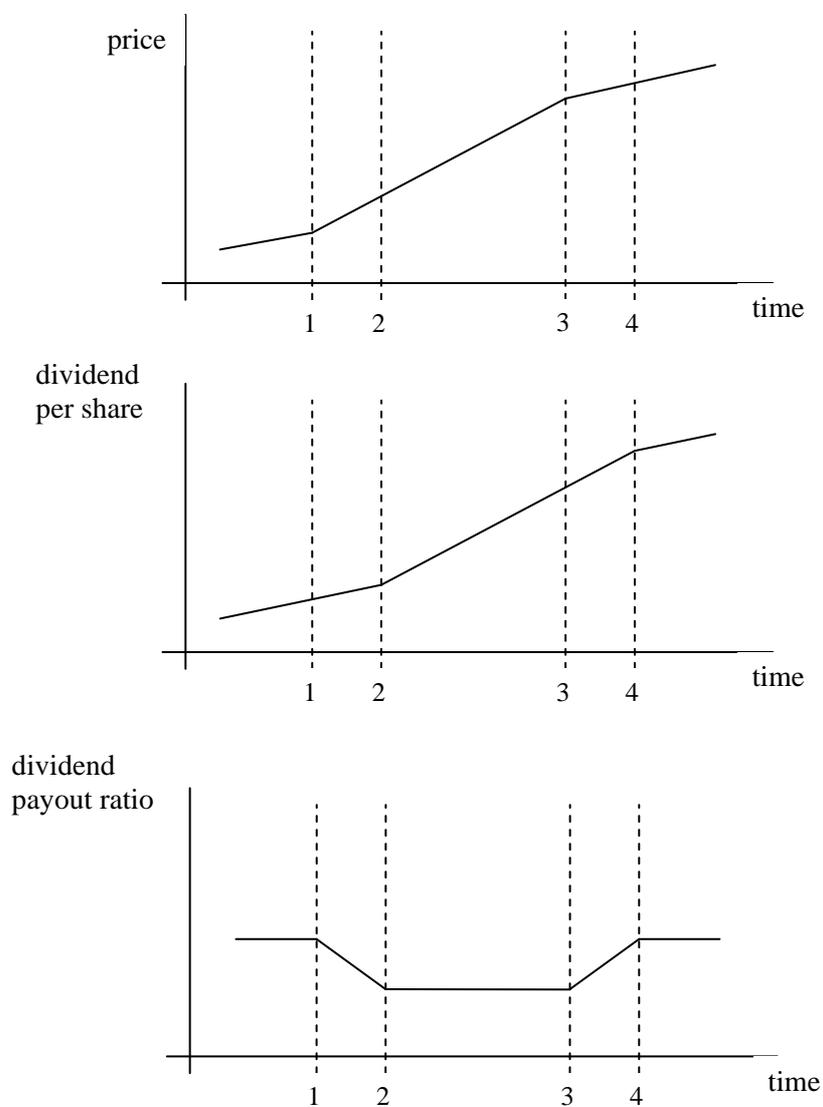
¹³ beginnersinvest.about.com

funds, it may decide to retain the earnings.

Other Factors

Inflation – with higher inflation the company keeps more gain. It depends on situation, if the inflation is linked to boom or stagnation. In the Czech Republic almost 75% of firms not conform on their level of dividend to development of inflation. (Marek, 2000). The influence of inflation on stable dividend policy, *ceteris paribus*, is demonstrated on Figure 3.

Figure 3: The influence of inflation on the stable dividend policy



Source: Marek (2000), p. 62

We segmented the time into 5 phases (Marek, 2000):

1. Phase (before point 1, on our figure 3): The price is increasing with stable growth rate, the inflation is small. The same growth rate we can see in dividend per share. Dividend payout ratio stays stable as the profit is changed only due to inflation.
2. Phase (between points 1 and 2): inflation comes over from small to high (at least of two digits). Increase of growth rate inflation is followed with some delay by the increase of dividend per share. Dividend payout ratio decreases due to fact, that companies keep higher percent of gain for reinvestment purposes.
3. Phase (between points 2 and 3): growth rate of inflation and dividend per share is the same. The dividend payout ratio stabilizes on lower level than in the starting phase.
4. Phase (between points 3 and 4): the running inflation changes again on slow rate. Decrease of inflation growth rate is followed with some delay by the decrease of dividend per share. The gain is influenced by higher inflation so the dividend payout ratio increases.
5. Phase (after point 4): The growth rate of price level and dividend per share are aligned. The dividend payout ratio is again stabilized.

As other factor which influence dividend policy we should also bring forward Company size, Regulations, Subjective preferences of shareholders, Customs and beliefs, Culture - group-affiliated corporations in Western Europe pay significantly higher dividend rates than in Asia, dampening insider expropriation. Moreover, the presence of multiple large shareholders increases dividend rates in Europe, but reduces them in Asia,¹⁴ General economic condition - in case of uncertain economic and business conditions the management may like to retain whole or large part of earnings to build up reserves to absorb future shocks. In the period of depression the

¹⁴ Faccio - Lang - Young (2001) find that significantly higher dividends are paid by corporations that are "tightly affiliated" to a business group via a chain of control that comprises at least 20% of the control rights at each link, and amongst such corporations, to those having a lower O/C ratio. The ratio O/C is a measure of the corporation's vulnerability to insider expropriation within a group of corporations. Controlling shareholder's ownership rights O and its control rights C. By contrast, for corporations not tightly affiliated to a group, a lower O/C ratio is associated with significantly lower dividend rates, since the controlling shareholder will seek to keep control of corporate resources.

management may also retain a large part of its earnings to preserve the firm's liquidity position, Concentration and domicile of ownership - firms with a dominant majority owner pay dividends less often and their target payout ratio is small.

„The hardest thing in the world to understand is the income tax. “

Albert Einstein

2.3. DIVIDEND TAXATION

The tax consequences are important. The existing literatures state that the taxes influence the dividend payment. If the dividend tax rate goes down there is a smaller but more frequent dividend payments, on the other hand if the dividends are taxed higher than capital gains, there is an evident aversion towards dividend paying companies and the share repurchasing is more attractive and preferable. Moreover, sometimes institutional investors are less taxed than the private individual investors and this fact can lead to the ownership clientele effects.

In the USA the federal income tax regulations assess a tax against any stockholder who receives a corporate dividend, even if he purchased the stock immediately before the ex-dividend date and paid a price which fully reflected the imminent dividend. Conversely, a stockholder who sells immediately before an ex-dividend date and obtains a price which actually incorporates most or all of a forthcoming dividend will pay no tax on the dividend, since he nominally does not receive it. This situation makes it advisable for a tax-paying prospective seller to sell before rather than after an ex-dividend date. The same conclusion we get from result in the USA, that the price of share drop-off on the ex-date of about 90 per cent of the dividend.

Also capital gains taxes may be a factor in these calculations. The seller who sells before an ex-dividend date will escape income taxes on the dividend, but his selling price may contain a commensurately larger taxable capital gain. Likewise, the buyer who buys after the ex-dividend date obtains

an advantage in the lowered price, which may ultimately cost him a slightly increased capital gains tax. Combined consideration of these two factors leads to the conclusion that traders in a 25 per cent tax bracket would find an equal advantage in trades before and after an ex-dividend date if the price drop-off were 75 to 85 per cent of the dividend, while those in a 50 per cent bracket would find an equal advantage if the drop-off were 50 per cent to 66.8 per cent. This suggests that a fully rational market might make the drop-off between 65 and 75 per cent of the dividend -taking into account a market composed of high-bracket individuals, low-bracket individuals, and all manner of corporations, institutions, and fiduciaries. (Campbell - Beranek, 1955)

The lower rate of taxation on capital gain relative to dividend income suggests that firms with low payout ratios should sell at a premium relative to firms with high payout ratios. The advantage of capital gain is also PV of taxes, because taxes from dividends have to be paid immediately, taxes on capital gain when the capital gain is realized.

Also some type of businesses that operate in mediocre industries (such as steel, railroads, etc.) with low returns on equity would best serve shareholders by paying out profits as dividends. Investors can almost certainly earn a higher return, even when adjusting for the adverse tax effects. True to form, the company pays out a lot of its cash flow to shareholders.¹⁵

Double taxation

When dividends are paid, individual shareholders in many countries¹⁶ suffer from double taxation of dividends. The corporation paid income tax to the government on the profit it earned, and then when the dividend is paid, the individual shareholders are taxed at personal income tax rates. In fact, they have paid the government twice. In many countries, the tax rate on dividend income is lower than that for other forms of income to compensate for tax paid at the corporate level. In contrast, corporate shareholders often do not pay tax on dividends because the tax regime is designed to a tax

¹⁵ beginnersinvest.about.com

¹⁶ In the Czech Republic the Double taxation of dividends is prevented.

corporate income only once. The shareholder will pay a tax on capital gains only when the shareholder chooses to sell the stock. This difference in tax treatment is another reason many investors opt for long-term equity holdings that reinvest capital into the business instead of paying it out in the form of a dividend; by avoiding the double-taxation, they can compound their wealth at a faster rate.

Dividend taxation in the Czech Republic

The dividend yield is taxed by withholding tax – dividends are diminishing about withholding tax, that means that taxpayer do not pay any tax. Dividend taxes are capitalized in the values of the shares. The tax imposed on dividends paid by Czech corporations is 15%¹⁷ for legal entities with residence in the Czech Republic and for natural persons with residence in the Czech Republic. The rate of tax for non-resident is 25%. There is applied the same income dividend tax treatment to individuals and corporations and the marginal tax rate on cash dividends is the same for all types of shareholders. Dividend paid between two Czech companies is tax exempt.

It is interesting to shortly mention the difference between the dividends paid to domestic and foreign pension funds, because the European Commission requests the Czech Republic to end discriminatory taxation of foreign pension funds. Although, the tax of 15 % on dividends paid both to domestic and foreign pension funds, domestic pension can either credit the withholding tax against corporation tax payable on other income¹⁸, or they get a refund of the withholding tax. Pension funds established in other states cannot get a refund of the 15% withholding tax on the dividends paid to them. The result is that Czech pension funds are effectively exempt from taxation on Czech dividends, whereas pension funds from elsewhere states pay tax at a rate of 15%.¹⁹

¹⁷ There was 25% rate till 1999.

¹⁸ Dividend income is not part of their corporate tax base.

¹⁹ europa.eu

2.4. INFORMATIONAL CONTENT OF DIVIDENDS

Miller and Modigliani were the first who explicitly suggested that dividends can convey information about future cash flows when markets are incomplete. The "information content of dividends" hypothesis asserts that dividends provide information to the market, that managers use cash dividend announcements to signal changes in their expectations about future prospects of the firm. Specifically, if the firm raised (lowered) the level of dividends, it is to be interpreted as tangible evidence of the firm's greater (lesser) ability to generate cash through future profits. Moreover, if earnings drop and the firm does not cut its dividends, the firm is hoping to convey to the investors that the earning decline is only temporary and that the future of the company is better than the drop in earnings suggests. (Ang, 1975)

It sounds amazing, that we can use dividends to separate money-makers companies from loss-making. But of course it is not so easy. There has been made a lot of models to prove this content but the conclusions are very different.

Empirical studies of Watts (1973) based on time-series regression with using annual data analysis have found that dividends convey very little, trivial information about the subsequent earnings of the firm, since monopolistic access to the information would not enable one to earn above-normal returns²⁰. Consistent with the early findings of Watts, also Ang (1975), Berntzi, Michaely, Thaler (1997) and Garrett, Priestley (2000) show that, dividend changes do not provide information about future permanent earnings changes. However, they find evidence that dividends convey information about current (and past) permanent earnings.²¹

Kao and Wu (1994) using Marsh-Merton model²² to test the

²⁰ If the stock market is efficient (stock prices "fully reflect" available public information) and stock prices depend on expected future earnings, then any better prediction of future earnings that is possible with dividends should be reflected in stock prices at or before the time the dividends become known. Watts (1973)

²¹ The reason is that it is possible that most firms on the average have a rather short-planning horizon. At best, the firm can make only intermediate-term projections of earnings.

²² Managers use dividends as a signaling device in that dividend changes convey information about unexpected shocks to earnings. The idea that managers may have private information relevant for the estimation of permanent earnings is briefly considered by Marsh

information effects of dividends and their results show that dividend changes do not only signal significant changes in the firm's future earnings prospects but also reflect the well-known practice of dividend smoothing.²³ Their results support the contention that dividend changes reflect both expected and unexpected permanent earnings changes and also show that dividend changes signal changes in management's views of the firm's future earnings prospects. Following their opinion, Watts was not right, because he used OLS regressions to examine the relation between unexpected dividend and earnings changes, but this regression tends to bias toward finding no linkage from dividends to future earnings because observed dividends exhibit stickiness – infrequent dividend changes.

Some other view by Handjinicolaou and Kalay (1984), who analyze bond returns around dividend changes, support the information content hypothesis. They report that bond prices are not affected by dividend increases but react negatively to dividend reductions. Also, the results of Kao, Wu (1994) show corporate dividend behaviour is entirely consistent with information content hypotheses. And what do companies in the Czech Republic think about the informational content of dividend? 68% of companies in the Czech Republic hold an opinion that the increase of dividend per share increasing market price of share, what advance the informational content of dividends. (Marek, 2000)

The issue of whether dividends signal anything about permanent earnings is a very controversial theme. In the days many investors see the "information content of dividends" as a sign of safety and financial conservatism. Board of Directors will often begin to pay dividends to help stabilize the company's stock. High dividends predict higher future earnings.

But higher dividends do not necessarily make the company a better investment, especially in the long run. Informational content of dividend can be true in a short period but paying dividends without earnings is in a long

and Merton. However, they argue that it is unlikely to be an issue because, at the aggregate level, firm-specific information will be washed out.

²³ A positive relation between unexpected changes in dividends and permanent earnings is found, and this relation appears to be correlated with certain firm attributes. The strength of dividend signaling is negatively related to the firm's systematic risk, external equity financing, and size and positively related to net investments and the degree of dividend smoothing.

run unsustainable. Companies that earn high returns on equity, have little or no debt, and a large room to expand in their current industry would best serve their shareholders by paying no dividends. Instead of it, they should opt to reinvest all of the company's available resources into growing the value of the underlying business. The shareholders will be rewarded through appreciation in the stock price.²⁴

Since dividend decisions are almost solely at management's discretion, announcements of dividend changes should provide less ambiguous information signals than earnings numbers. Furthermore, given the discrete nature of dividend adjustments, signals transmitted by these changes may even provide information beyond that conveyed by the corresponding earnings numbers. If dividends then do convey useful information, in an efficient capital market this will be reflected in stock price changes immediately following a public announcement. A major difficulty in assessing dividend information content is in the fact that dividend and earnings announcements are often closely synchronized. (Aharony, Swary 1980). Conflicting results were found as to whether cash flows or earnings are the better measure of the firm's ability to pay dividends. Aharony and Swary (1980) find that changes in quarterly dividends provide a signalling device that is at least as effective as quarterly earnings numbers. Findings about capital market reaction to the dividend announcements studied strongly support the hypothesis that changes in quarterly cash dividends provide useful information beyond that provided by corresponding quarterly earnings numbers. In addition, the results also support the semi-strong form of the efficient capital market hypothesis; that is, on the average, the stock market adjusts in an efficient manner to new quarterly dividend information.

An interesting question is whether good news or bad news drives dividend changes. Under dividend smoothing, managers are reluctant to reverse dividend increases. Therefore, we expect to find that dividends react to positive rather than negative shocks to permanent earnings. The analysis by Garrett and Priestley (2000) shows, that dividends are increased only in

²⁴ beginnersinvest.about.com

response to good news.²⁵ This finding suggests that dividends convey information regarding higher current permanent earnings. There is very strong evidence that dividends convey information about positive shocks to current permanent earnings. They also find an evidence to support the hypothesis that information about expected changes in permanent earnings is already captured in lagged stock price changes and, thus, we find no evidence to support the notion that dividends signal future permanent earnings. In addition, the model is stable over time, suggesting that it provides a worthy representation of aggregate dividend behaviour.

The informational content of dividends hypothesis is consistent with a positive stock price reaction to a dividend increase. Information content implies bond prices should increase when dividend increases are announced. The results show a positive reaction to large dividend increases in the stock market and a negative price reaction in the bond market. (Dhillon, Johnson 1994)

It is not easy to answer the question if the informational content of dividend exists or if the dividends provide information about past, current or future earnings. We probably have to wait some time for a definite answer of these questions. But there is a fact, that in the companies with close relationship between company and shareholder the informational content is less important.

2.5. BRIEF EVOLUTION OF DIVIDEND THEORIES

The first theoretical papers and empirical studies about dividend policy came out as late as 1950s. Till then dominated the opinion, that the more percent of the gain is created by dividend, the higher is the stock price.

²⁵ Possibly, this is observed because negative contemporaneous shocks can be absorbed since only a fraction of unexpected increases in permanent earnings are distributed as dividends. (Garrett, Priestley 2000)

2.5.1. BASIC DIVIDEND THEORIES

In this time we can distinguish the four basic dividend theories, pro-dividend, anti-dividend, neutral and latest theory. The scheme of evolution of dividend policy is drawn up in Figure 4.

Pro-Dividend Theory

The first more significant theoretical paper was written in the middle 1950s by Lintner. Lintner was one of the first who suggest that current dividends, better to say changes in dividends²⁶, depended on future as well as current and past earnings. He found the dependence of a firm's market value on the rate at which dividends are paid out of earnings (dividend payout rate). According to his opinion the long term goal is to hold some stable dividend payout ratio²⁷, investments don't have a significant influence on level of dividend and the main factors which influence a dividend policy are achieved gain and present level of dividend per share.

Lintner's partial adjustment hypothesis holds that the firm, realizing the transitory nature of current earnings, adjusts only partially to its desired level of dividends with a time lag. Recall that a firm would gradually adjust its dividend to a given change in earnings; consequently, dividends will tend to lag behind earnings and the lags will be greater for the shorter-run components. The dividend in his simple model can be calculated as a weighted average of current and past earnings.

It is more likely to change its dividends fully if it is determined that part of the earnings change is long run, and only partially if the earnings change is more or less short run.

Gordon and others (From latter authors of pro-dividend theory we can mention also J. Long jr., H. Shefrin or M. Statman) present theories of valuation where prices of share and capitalization rates are very much dependent upon the dividend policies of firms.

²⁶ The managers focuses more on changes in dividends than on absolute value.

²⁷ Grow companies have low payouts, mature companies have high payouts.

Neutral-Dividend Theory

Revolutionary paper in dividend policy was published by Miller and Modigliani in 1961 which demonstrated,²⁸ that the value of the firm does not depend on the firm's dividend payout rate (neutrality dividend policy). To prove the irrelevancy of dividend policy in a perfect financial market Miller and Modigliani adopted substitute financing approach, the assets of the firm are hold constant and compensating equity financing is used to replace dividends.²⁹ In a perfect market, the market value of a firm's equity is independent of the number of shares outstanding. The investors are only interested in the total returns on shares and are indifferent as to whether the returns take the form of dividends or price appreciation on the shares.

They suggested that a firm's market value depended on its expected future earnings and not on current earnings. When a firm follows a policy of dividend stabilization, investors will have good reason to interpret a change in the dividend payout rate as a change in management's views of the firm's future profitability.

Among the academicians is these theory most generally accept although, there exist some criticisms of MM model. Most considerable are the unrealistic assumption - in the real world under uncertainty, taxes, investor preferences, and imperfect capital markets we can expect that dividend policy does affect the price of equity shares, Principal-agent problem,³⁰ The ability of dividend policy to create a new relevant security, The influences of dividend policy, through its effect on the size of aggregate investment, on market-wide discount rates, The prospects of issuing shares to finance capital expenditures may have a depressing influence on prices of share at

²⁸ under the assumptions of perfect capital markets, rational behavior of all traders, absolute certainty, zero taxes (no differences in taxation between capital gain and dividend income) and zero transaction costs

²⁹ Gordon and more recently Brennan also claim that in a perfect financial market the dividend policy is irrelevant but they used neutral reinvestment approach; assets are permitted to vary with changes in dividends but in such a way that the change in investment is not desired for itself. (Rubinstein, 1976)

³⁰ Agency problem arise under conditions of incomplete and asymmetric information. Due to the separation of company's owners and managers, the principals (owners) delegate decision-making authority to the agent (managers). The central dilemma is how to get the agent to act in the best interests of the principal when the agent has an informational advantage over the principal and has different interests from the principal. The point here is the problem of imperfect information and how it influences the value of an enterprise and also dividend policy.

the beginning of the period. There is also the question of whether there is an optimal way for the firm to pack ex post returns for its stockholders.

To neutral dividend policy comes into line also F. Black, M. Scholles and M.H. Miller or K. Rock.

Anti-Dividend Theory

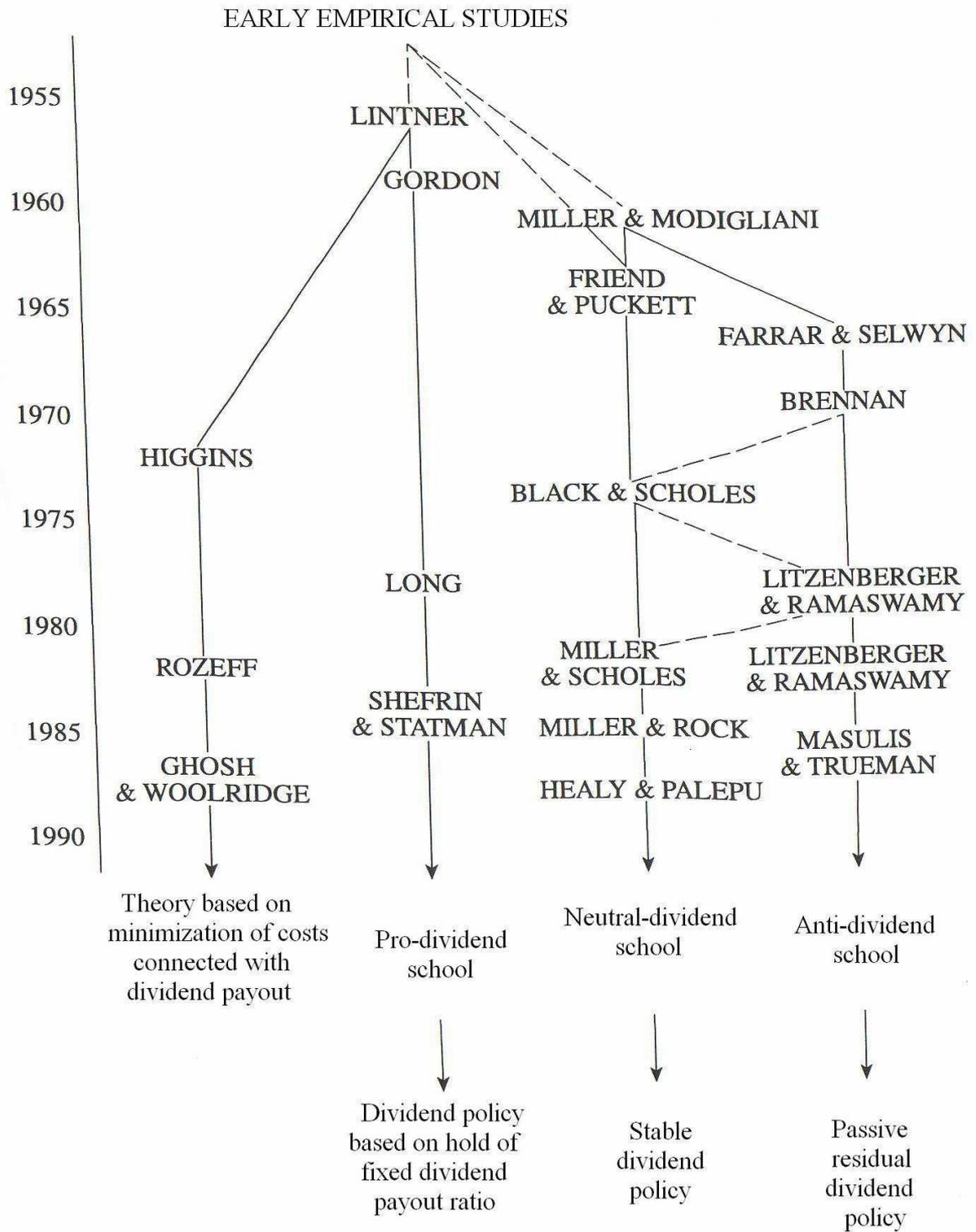
In 70's the anti-dividend theory started and not only because of discredit early empirical studies. The name anti-dividend theory comes from Farrar and Selwyn statement that optimum dividend policy is not to pay any dividend because of tax disadvantage. Because the dividends are taxed more than capital gains, the firms will want to pay the lowest dividends possible. The increases in dividends decrease investors' expected utility, implying that in a competitive stock market equilibrium dividend payment of value maximizing firms are zero. (Bortz – Rust, 1984) Also investors will not want the shares with dividend due to tax disadvantage. The opinions of this school show itself in formation of a new taxes system in the USA.

This opinion was evolved by m. Brennan, K. Ramaswamy and R. H. Litzenberger, R. Masulisov or B. Trueman.

Latest Theory

The latest theory is based on minimization of costs which are connected with payment of dividends. The most important agents of this theory are R.C. Higgins or M. Rozeff. This theory pursues find the optimal dividend portion in relation to e.g. agency cost. Due to difficulty of empiric proofs and application in praxis is this theory not much applicable, on the other side is much more interesting for more and more theorist.

Figure 4: The scheme of evolution of dividend policy



-----> Arrow showing critical reaction of one theory on other theory
 ———> Arrow showing the development direction of relevant theory

Source: MAREK (2000), p. 117

2.5.2. THE EVOLUTION OF DIVIDEND POLICY IN THE CZECH REPUBLIC

The consequence of dividend policy is connected with existence of market economy and private ownership of companies. For this reason in the Czech Republic the dividend policy started to be discussed in connection with privatization in 1990's. Then the problem for managers comes forward how to appoint the dividend policy and consideration how to assign the dividend value.

In the first half of 1990's the most of Czech companies didn't pay dividend and thought that dividends are a luxury. They believed that dividend payments represent a cost to the corporation. For these reasons there was only a limited number of companies paying dividends, in addition dividend were often low and remained relatively fixed though the stock price rose. It can be comprehensible in the 1990's because of companies was undercapitalized and primary needed to invest in modernization. But how is seen from table 1. and figure 5. there was an increasing number of firms which paid out dividends during 1993 – 2003 and also the value of dividends increased until 2000. If the average annual dividends are measured on an annual basis per firm for dividend-paying firm, the average payout of CZK50,46 in 1993 increased to CZK279,06 in 2000. The reason can be to look for new ways how to attract investors.

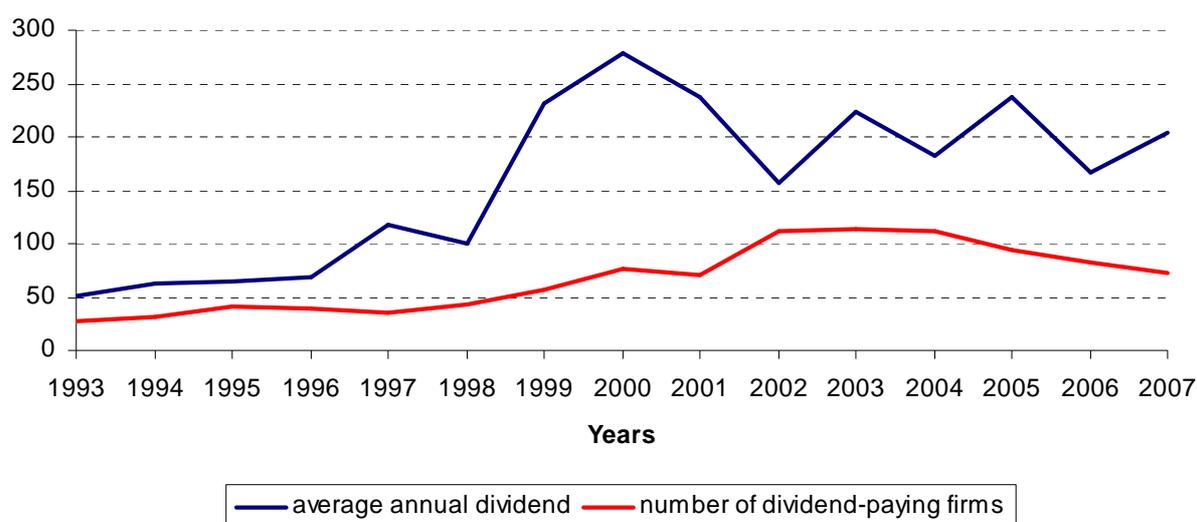
In the last years there is decrease of number of dividend-paying firms from 114 in 2003 to 72 in 2007, but the annual dividend behaves erratic. The reason of decreasing number dividend-paying companies were bankrupt and expropriation some of them.

Table 1: Development of annual dividend and number of companies paying dividend in given years in the Czech Republic

Dividend per year	Average annual dividend	Number of companies paying dividends
1993	50,46	28
1994	62,30	31
1995	64,75	42
1996	68,30	40
1997	116,83	36
1998	100,10	44
1999	230,57	56
2000	279,06	76
2001	236,32	70
2002	157,25	111
2003	223,70	114
2004	181,77	112
2005	236,76	95
2006	166,45	83
2007	203,28	72

Source: ipoint.cz, financninoviny.cz, miras.cz

Figure 5: Development of dividend and number of companies paying dividend in the Czech Republic



Source: ipoint.cz, financninoviny.cz, miras.cz

Buying shares in the Czech Republic due to dividend is not very gainful. The exception from this is Philip Morris ČR, which pay out for shareholders a whole net profit and a very attractive dividend. Also Telefónica has in the last years a high dividend yield. See more about dividend yield in table 2.

But every year the huge amounts are going to foreign owners through the dividends. They recoup in this way their investment. In 2007 dividends for foreign owners from its Czech companies were higher than 100 billions. Due to high dividends the current balance-of payments account in 2007 ended in a deficit. So high dividends are caused by a high grow of our economic (it was about 6,4% in 2006), which helped to very good gains³¹ and the reason can also be crises in the USA (firms which were touched by this crises try to improve their position on their daughters in middle Europe countries).³²

Table 2: The gross average dividend yield for some companies in the Czech Republic

Year	ČEZ	Jihomor. Plynárenská	Philip Morris	Pražská Energetika	Pražská Plynárenská	Slezan F.Místek	Telefónica	Zentiva	KB
1999		2,91%	11,26%	7,29%	1,73%				
2000	1,87%	3,61%	15,42%	5,27%	1,48%	7,39%	1,20%		
2001	2,87%	7,21%	19,85%	5,98%	1,54%	4,51%			1,16%
2002	5,20%	10,50%	15,18%	10,19%	6,26%	2,44%	20,16%		2,50%
2003	7,10%	8,83%	12,43%	8,04%	8,91%	1,74%	5,81%		9,24%
2004	4,42%	10,43%	9,87%	6,59%	8,21%	0,24%		1,35%	3,44%
2005	3,07%	12,65%	6,17%	5,87%	4,32%	0,25%	9,96%	1,04%	7,54%
2006	2,49%	8,36%	4,74%	8,03%	4,16%	0,24%	10,33%	0,98%	4,52%
2007	3,74%	5,78%	8,82%	12,47%	4,16%		8,88%	0,60%	4,63%

Source: ipoint.cz, annual reports of individual companies, www.pse.cz

³¹ On the other hand the foreign companies invest in the Czech Republic about one half of aggregate gains. In development countries it is only about 2/5 from their gains.

³² patria finance

And which changes we can expect in dividend policy in the future? In this time of financial crises we can expect that the companies will abate their leverage and also abate the dividend or conclude dividend payments. This can be temporarily painful for shareholders but to pay dividend is going to be really a luxury. But this conclusion is not clear, because the company's reluctance against cut their dividends how was mention above.³³ The company's board of directors can maintain their dividends in the face of losing big amounts of money. It is possible that from this reason also in the Czech Republic some companies as ČEZ declared that the actual financial crises do not change their long-term dividend policy.

³³ This disadvantage of dividends can be the reason why some firms give priority to share repurchase, more in chapter 4.

“All models are wrong, but some are useful. “

George E. Box

3. MODEL

The main part is devoted to the dividend policy in the Czech Republic and its impact on firm value. The general view is that a stock price should decline on the ex-dividend date by approximately the amount of the cash dividend. And from this reason it is no matter whether one buys or sells before or after the ex-dividend date (except for a possible income tax factor). This assumption has apparently led to the conclusion that it is fair and proper on the ex-dividend date to reduce all open bids, as well as to stop orders to sell, by the amount of the dividend (Campbell - Beranek, 1995). But many investors feel that when a stock-dividend stock goes ex-dividend its stock prices fell on average by less than the amount of the dividend on the ex-dividend date. If true, this certainly represents a small temporary price benefit.

In a variety of existing literature about dividends in the USA there exists the evidence that on the ex-dividend date the stock price is adjusted downward and the marginal price drop is not significantly different from the dividend amount. Barker (1959) analyses the 224 cases and finds the average stock price drop-off on the ex-dividend date tends to be about 90 per cent of the amount of the dividend when the stock market is otherwise stable. Consequently, a taxpaying investor would do better to sell before an ex-dividend date and to buy after it. If he held his stock until after the ex-dividend date he would lose this amount because of the price drop, and he could retain much less than this percentage of his dividend after paying his top-bracket tax on it. A tax-paying purchaser, on the other hand, would usually do well to buy on the ex-dividend date; the ex-dividend price drop-off of 90 per cent of the dividend is a greater advantage to him than he could obtain by buying the dividend and paying a tax on it.³⁴ This becomes apparent on the

³⁴ This finding was based on the federal income tax regulations which tax cash dividends at the individual income tax rate when received. Conversely, they may be taxed at the capital gains rate to the extent that the stock price reflects an imminent cash dividend if sold just before the ex-dividend date. (Barker (1959), Campbell - Beranek, (1955))

ex-dividend dates for larger dividends. But most individuals can not count on this advantage unless they make a large number of trades and they are subject, immediately or eventually, to the capital gains tax rate.

Moreover, when dividends are increased or initiated, prices tend to go up, and when dividends are cut or omitted, prices fall. (Benartzi - Michaely - Thaler, 1997) Shaw (1991) found that before the ex-dividend day there is a significant positive excess returns and volume, and significant negative excess returns are found on the ex-dividend day.

On the other hand, the findings in Japan prices rise on the ex-day and that dividend-related tax effects appear to be secondary. Kato and Loewenstein (1995) document significant negative excess returns for 5 days leading to the ex-day and significant positive excess returns on the ex-day that is the first trading day of record of the new fiscal year. This suggests that the effects that determine the pattern of stock prices during the event period have no lasting economic impact outside the event period. Hayasi and Jagannathan (1990) come to the same results, and the rise in the stock price explains by good news influencing the stock market on the ex-dividend day.

Now we try to discover how the influence of the dividend on the stock price is on the ex-dividend day in the Czech Republic. From the first view on the prices of share around record and ex-dividend date we don't see any significant price changes. The price is in most cases very similar as day before. But we should examine our data more precisely.

3.1. EVENT STUDIES

Our main aim is to evaluate the influence of dividend in terms of value creation for shareholders. We decided to apply the event study methodology, which is based on observing the abnormal returns to shareholders around the record day.

Our sample includes 14 firms listed on the Prague Stock Exchange and covers the period from January 4, 1999, to December 28, 2007. The data include daily closing prices and daily trading volume for individual

securities and prices for PX index obtained from Magnus.

3.1.1. THE PRINCIPLE OF EVENT STUDIES

Event studies are based on observing abnormal returns of stocks of companies in a certain time period before and after the dividend announcement. The only data needed are the ex-dividend day or record date and daily stock prices of the involved parties around that date. The information obtained by observing abnormal returns show shareholders' overall expectations about the value creation or destruction.

In the event study approach there is an important assumption of at least the semi-strong efficiency of capital markets³⁵, which denotes that markets correctly and immediately react to any relevant public information. Semi-strong efficiency implies that share prices adjust to publicly available new information very rapidly and no excess returns can be earned by trading on that information. Only information that is not publicly available can benefit investors seeking to earn abnormal returns.

The data are a weakness of the event studies. There can be multiple shocks which can cause the wrong estimation of α and β and consequently bad abnormal return.

Other problem can come with the short period around the event day which may reflect predominantly short-run speculative trading and than is only a limited use of abnormal return for identify the dividend effect.

There is also the possibility of non-synchronous trading. The problem arises when returns on a security and a market index are measured over different trading interval (we take into account the last price in a trading day, but when we consider security with lower frequency of volume than the market index moves, we do not compare the same time points). However,

³⁵ There are three common forms of the efficient-market hypothesis: weak-form efficiency, semi-strong-form efficiency and strong-form efficiency, each of them have different implications on the markets. **Weak-form efficiency** - Prices must follow a random walk. Excess returns can not be earned by using investment strategies based on historical share prices. Only the fundamental analysis may provide excess returns. **Strong-form efficiency** - Share prices reflect all information, public and private, and no one can earn excess returns. If there are legal barriers to private information becoming public, as with insider trading laws, strong-form efficiency is impossible, except in the case where the laws are universally ignored.

when the studied securities are sufficiently liquid, the problem of non-synchronous trading does not need to be considered. (Stárová, 2008)

3.1.2. METHODOLOGY

To apply an event study, we first need to define the event day and the event and estimation windows.

Event Day

The event day should represent the day when the firms announce the unexpected news. Setting correctly the day 0 for the analysis is crucial. But it may not be an easy task. On our sample we decided to choose the event day as a date of record. The record date is also a date of general meeting for most of our examined companies.

Maybe it will be better to use the ex-dividend day, but we don't know the exact ex-dividend day for every firms. Setting of ex-dividend day depends on length of settlement (duration of money and rights transfer after conclusion of a deal), which is as per standard deal conclusion plus 3 days for deals concluded in SPAD in scope of automatic deals. It means that an ex-dividend day is a record day minus 2 days. Companies, with stocks registered at Středisko cenných papírů Praha, have right to stop for 7 days the settlements of deals, what means, that ex-dividend day may be a record date minus 2 days minus possible 7 more days.³⁶ From the companies mentioned on BCPP the right to stop settlement is using usually by ČEZ, Philip Morris ČR or Komerční Banka.

Event Window

Event window is the period of time around the announcement for

³⁶ Once opportunity costs are considered, the returns on ex-dividend days for companies which are settled after more business days must therefore be higher than on other days. Nevertheless, the opportunity costs are so small in relation to the observed excess returns that we omit this.

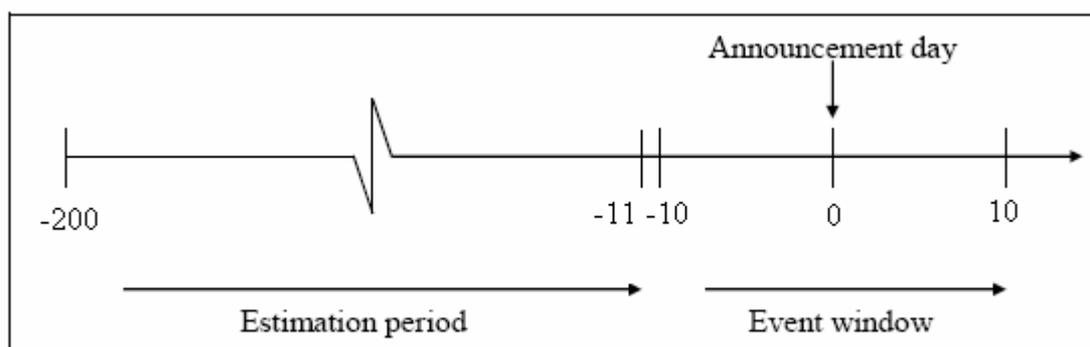
which abnormal returns are analyzed. Although so many event studies have been conducted, there is still no prevailing opinion on the ideal length of the event window. If we select a too short window, we might miss the effect of the event if we are not able to locate the time when the information reached the markets precisely enough. On the other hand selecting a long window increases the standard deviation of normal returns that can be expected during this period and makes it more difficult to discern the effect of the event – which is demonstrated by a reduction in the t-statistic. (Hanzlík, 2007)

We applied a few different event windows, to observe the market reaction more precisely. Symmetric windows with the same number of trading days prior to and after the announcement day $[-10,+10]$, $[-5,+5]$, $[-2,+2]$ and asymmetric windows ending the day after record day $[-10,0]$, $[-5,0]$ and $[-2,0]$.

Estimation Window

Estimation window is the period over which the market model parameters are estimated. Usually, the period ends one day before the event window begins. We define the estimation window as $[-200,-11]$. We apply the longest period which is possible not to cover up the last record date because the estimation window shall not include the announcement day in order to avoid any effect of the announcement on the parameters.

Figure 6 : Estimation period and event widow



Source: Beitel - Schiereck (2001), p. 10

Calculation Of Abnormal Returns

The abnormal return is calculated as the difference between the observed return and the expected return:

$$AR_{jt} = R_{jt} - \hat{R}_{jt}$$

where AR_{jt} is the abnormal return on a stock $j = 1, \dots, N$ in day t , R_{jt} observed return on a stock $j = 1, \dots, N$ in day t and \hat{R}_{jt} is the expected return on a stock $j = 1, \dots, N$ in day t .

Market Model

In order to estimate parameters to gain the expected return, there exist several statistical models. We decided to apply the most widely used model of normal returns - standard market model (Cybo-Ottone - Murgia, 2000 and Fritsch et al., 2007). The market model has the following form:

$$R_{jt} = \alpha_j + \beta_j R_{Mt} + \varepsilon_{jt}$$

, where R_{jt} is the observed return on security $j = 1, \dots, N$ in trading day $t \in [-200; -11]$ and R_{Mt} is the observed market return (PX index) in day t , α and β are model coefficients and ε_{jt} is the random term which is assumed to be normally distributed with zero mean, a known variance and is independently and identically distributed across time. The returns were calculated in logarithmic form.

We applied the OLS regression to estimate the market model parameters α_j, β_j for each stock j . Then it is easy to establish the estimation of parameters α_j, β_j to gain the abnormal returns

$$AR_{jt} = R_{jt} - \hat{R}_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{Mt})$$

Aggregation of Abnormal Returns

The equation for cumulative abnormal returns (CAR) for any given event window $[t_1, t_2]$ is following:

$$CAR_{(t_1, t_2)} = \sum_{t=t_1}^{t_2} \overline{AR}_t$$

where $\overline{AR}_t = \frac{1}{N} \sum_{j=1}^N AR_{jt}$ is the average the daily abnormal returns for all N analyzed stocks.

Test Of Significance

We should not omit to test whether the abnormal returns are statistically significant or not. That means to test the null hypothesis that the observed cumulative abnormal returns are statistically not different from zero ($H_0 : CAR_{(t_1, t_2)} = 0$) against the alternative hypothesis ($H_1 : CAR_{(t_1, t_2)} \neq 0$). We applied a method presented by Brown and Warner (1984), which means that the test statistics for any event day is specified as:

$$t = \frac{\overline{AR}_t}{\hat{S}(\overline{AR}_t)}$$

The test statistic for any windows $[t_1, t_2]$ is a cumulative abnormal return standardized by standard deviation estimated over the estimation period [-200;-11]:

$$t = \frac{CAR_{(t_1, t_2)}}{\sqrt{(t_2 - t_1 + 1) \hat{S}(\overline{AR}_t)}}$$

$$\text{where } \hat{S}(\overline{AR}_t) = \sqrt{\frac{\sum_{t=-200}^{-11} (\overline{AR}_t - \overline{\overline{AR}})^2}{189}} \text{ and } \overline{\overline{AR}} = \frac{1}{190} \sum_{t=-200}^{-11} \overline{AR}_t$$

From equation $AR_{jt} = R_{jt} - \hat{R}_{jt} = R_{jt} - (\hat{\alpha}_j + \hat{\beta}_j R_{Mt})$ we can see, that the abnormal returns at time t are equal to the time t residual of the market model, so from our assumption the abnormal returns under the null hypothesis are normally distributed with zero mean and asymptotic variance

of σ_e^2 . Moreover, we assume the mean abnormal returns are independent, identically distributed, and normal, so the test statistics is distributed Student-t under the null hypothesis. For large values of n the student t-distribution can be approximated by the standard normal distribution. If the null hypothesis is rejected³⁷, we can conclude that the event had impact on distribution of security returns.

3.1.3. OUR RESULTS

First of all we analyzed the value effects for the entire sample. Our results are presented in the following Tables 3 and 4 and Figure 7.

We observe positive excess returns on and before the ex-dividend day (-2 day) and negative excess return after ex-dividend day. Our discovery of the positive excess returns before the ex-dividend day is consistent with result of papers in the USA. But to give support to result in the USA, that stock price should declines on the ex-dividend date, we should gain negative excess return on the ex-dividend day, which is not true. When we assume that ex-dividend day is also more then 2 days before record date (-7 days) there is only positive excess returns on, after and before the ex-dividend day. Moreover, our results are not significant in most of samples. Also the value of abnormal returns are very low, we expect higher abnormal returns around record or ex-dividend day. From our result the highest abnormal returns is 6 and 7 days before record day, that is ex-dividend day for some studied companies. The abnormal return on record date is even negative. We would expect the abnormal return to be negative, if the investor was receiving a tax credit on dividends. Especially around record date the very low or even negative abnormal return can be caused by the fact that the record day is mostly identical with declaration date. This means that the declaration of information about dividend is in the same date as declaration of other information which can influence the price of share as future plans of companies or trading income for previous year.

³⁷ For two-sided test, the abnormal returns are statistically significant at the 10% level for absolute values of the t-statistic in excess 1.64 and at the 5% level for absolute values of the t-statistic in excess of 1.96.

Based on current results we can conclude that there is a very small or no statistic significant influence of dividends on price of share. But we should put our data through a more detailed research. We compute average CARs for our 14 explored companies for symmetric windows around record day [-10,+10], [-5,+5], [-2,+2], for record date and asymmetric windows ending the record day [-10,0], [-5,0] and [-2,0]. For every window we find also t-value to confirm statistically significant of the cumulative abnormal returns. Our result can be seen in table 4 and figure 7.

Table 3: Abnormal returns

Day	Excess return	CAR
-10	0,02%	0,02%
-9	0,08%	0,11%
-8	0,24%	0,35%
-7	0,34%	0,69%
-6	0,40%	1,09%
-5	0,14%	1,23%
-4	0,09%	1,32%
-3	0,01%	1,33%
-2	0,18%	1,51%
-1	-0,13%	1,38%
Record date	-0,07%	1,30%
1	-0,03%	1,28%
2	-0,03%	1,25%
3	0,03%	1,28%
4	-0,15%	1,13%
5	0,03%	1,15%
6	-0,02%	1,13%
7	0,21%	1,34%
8	-0,01%	1,33%
9	-0,06%	1,28%
10	0,14%	1,41%

Source: Author's calculations based on data from www.pse.cz, ipoint.cz

Table 4: CARs for every company from 1999 to 2007

Event window	CAR	t-value	significance
[-10;+10]	1,41%	1,668	at 10% level
[-5;+5]	0,06%	0,093	not
[-2;+2]	-0,09%	-0,214	not
[0;0]	-0,07%	-0,389	not
[-10;0]	1,30%	2,037	at 5% level
[-5;0]	0,21%	0,430	not
[-2;0]	-0,03%	-0,082	not

Source: Author's calculations based on data from www.pse.cz, ipoint.cz

Figure 7: Development of CARs of the entire sample

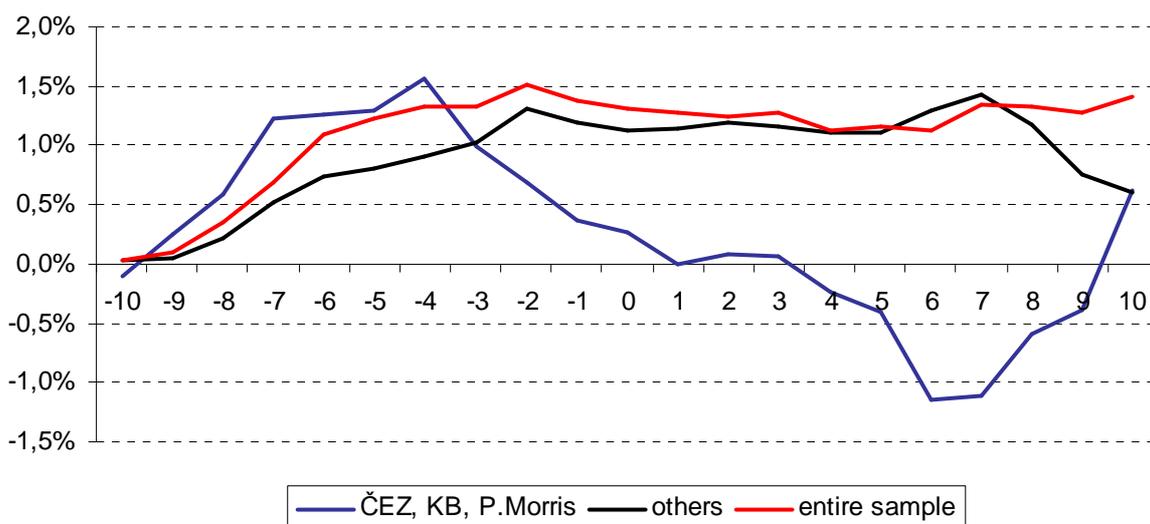


Source: Author's calculations based on data from www.pse.cz, ipoint.cz

We found for CARs both positive and negative market evaluation of record date, but the results were mostly not significantly different from zero. The t-test confirmed statistical significance of positive returns in longer intervals and no significant value was proved just around the record date. We expected this result. It is because not only the record date is important but also (and maybe most important) the ex-dividend day, which is a few day before record date, as was mentioned above. That is ratified by our result, that the most significant was interval [-10;0], from it is clearly visible that the market reaction comes mostly at the event and preceding days.

In the figure 7 we can see the sharp increase in CARs in interval [-9;-5]. In terms of dividend, this can be explained by the ex-dividend day, which can be maximum 9 days before record date. How we mention above, this is used by ČEZ, Philip Morris ČR or Komerční banka, which are the most important companies in our study. From this reason we try to divide companies on two groups, one group is the companies which used this right to stop settlement (ČEZ, Philip Morris ČR and Komerční banka) and second one is the other companies in our study, which has ex-dividend day 2 days before record date, figure 8. We can see a big different between these two groups. For the big companies in group one with the high average volume, there is a high volatility of the CARs in period around record date, but there is an evident increase around ex-dividend date and a decrease around record date. For the group two which is consists mostly of smaller companies with rare trading volume there is an increase of CARs (that means positive excess return) before and on ex-dividend day and a very smooth decrease after it (that means negative excess return). We can see that the development around record date of these two groups is different.

Figure 8: Development of CARs [-10;10]



Source: Author's calculations based on data from www.pse.cz, ipoint.cz

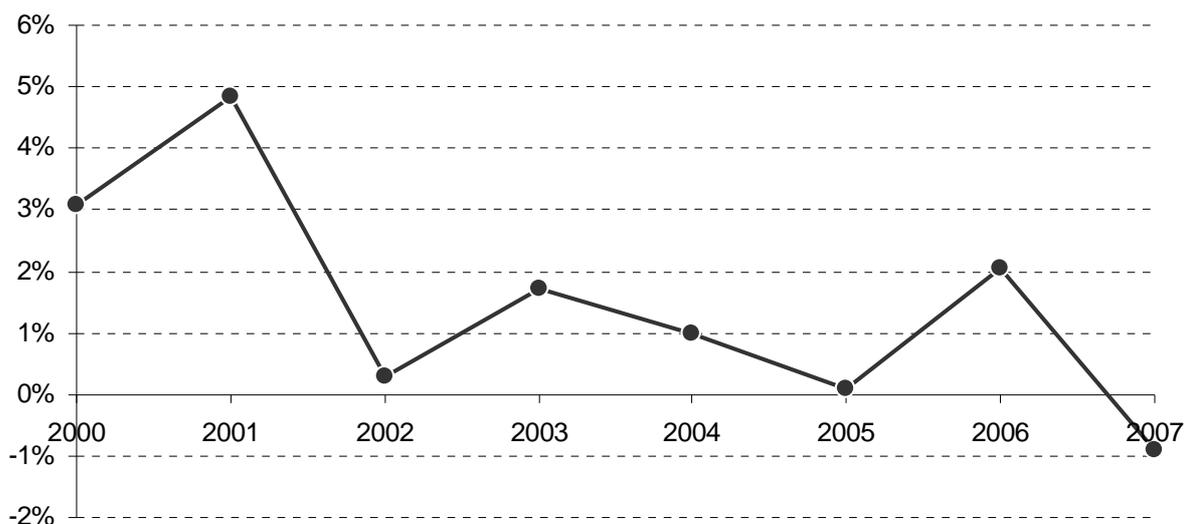
We can also try to look on development CARs in time for event window [-10;0]. From the figure 9 we can see, that the CARs was highest in 2001 and lowest in 2007, when it was even negative. In most of years there was positive but low CARs. Furthermore the significant of the CARs at least at 10% level was only in 2001 and 2006 (table 5).

Table 5: Development of CARs [-10;0] in time

year	2000	2001	2002	2003	2004	2005	2006	2007
CAR [-10,0]	3,09%	3,13%	0,29%	1,73%	0,99%	0,03%	2,05%	-0,89%
t-test	1,296	1,752	0,101	1,316	1,394	0,035	1,816	-1,083

Source: Author's calculations based on data from www.pse.cz, ipoint.cz

Figure 9: Development of CARs [-10;0] in time



Source: Author's calculations based on data from www.pse.cz, ipoint.cz

Our results from event studies with using of abnormal returns predicate about only a very small influence of dividend on price of share. We can try to use regression analysis with explanation variable of abnormal returns to find if the reason of increase in abnormal returns around ex-dividend days is the dividend or something else.

"If it's not in the OLS, it's not there. "
V.V. Chari

3.2. REGRESSION ANALYSIS

To find out if the dividends are sources of an increase in abnormal returns we employ regression analysis. We create a model with explanation variable of abnormal returns (AR) compute hereinbefore:

$$AR_t = \alpha + \beta_1 DY_t + \beta_2 GM_t + \beta_3 ED_t + \beta_4 EXVOL_t + u_t$$

where DY is the dividend yield on a company stock

GM is the dummy variable for take place of general meeting

ED is a dummy variable for ex-dividend date

EXVOL is excess trading volume

3.2.1. DESCRIPTION OF EXPLANATORY VARIABLES

Dividend Yield

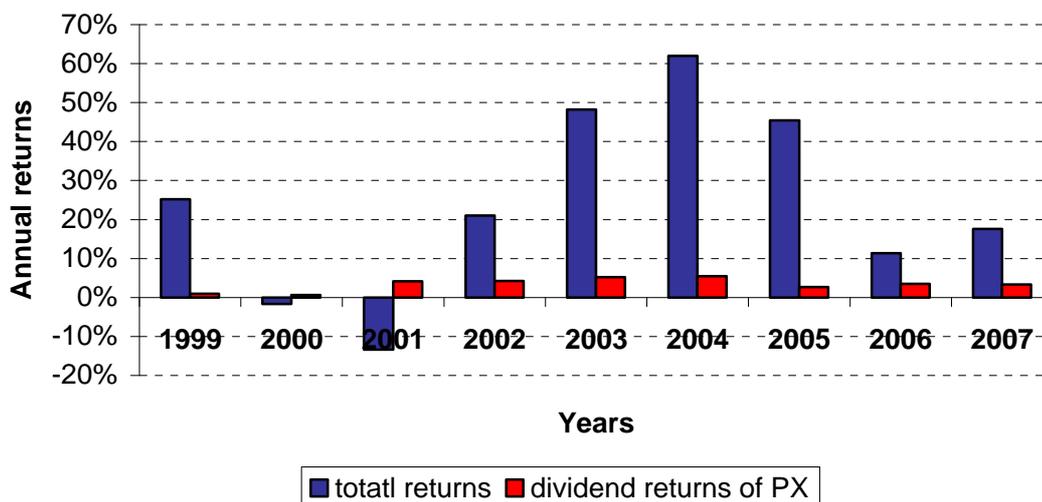
A dividend yield is calculated as the dividend per share divided by the price per share. Dividend returns are also a significant component of total stock return index³⁸, which is price index³⁹ plus dividend yield of PX index. The figure 10 describes the annual relationship of dividend returns to total stock returns. While dividend returns have been rather stable, the total returns have been instable from year to year. There can be also seen, that dividend returns have been only a small part of the total returns, on average it has been about 1%. The dividend yield of PX index has averaged 3,35% per year. In compare with neighbourhood countries it is not bad. The average dividend yield of PX index in the Czech Republic in 2006 was 3,4%. The returns for other countries publication in analysis of Cyrrus are following: Hungarian BUX 2,8 %, Polish WIG20 3,7 %, German DAX 2,7 % and

³⁸In the USA, where is used high stock buyback, is the difference among performance of price index and index of total return much lower than in Europe, where are preferred traditional dividend payouts.

³⁹ This index does not consider the reinvestment of dividends and is quantified only from prices of share on given market.

Austrian ATX 1,9%. (www.cyrrus.cz) On the other side the dividend yield is in the Czech Republic considerably impressed with two companies (Telefónica a Philip Morris), while in German DAX is about coessential 30 companies.

Figure 10: The annual returns



Source: Author's calculations based on data from www.pse.cz

Table 6: Average dividend yield for individual companies

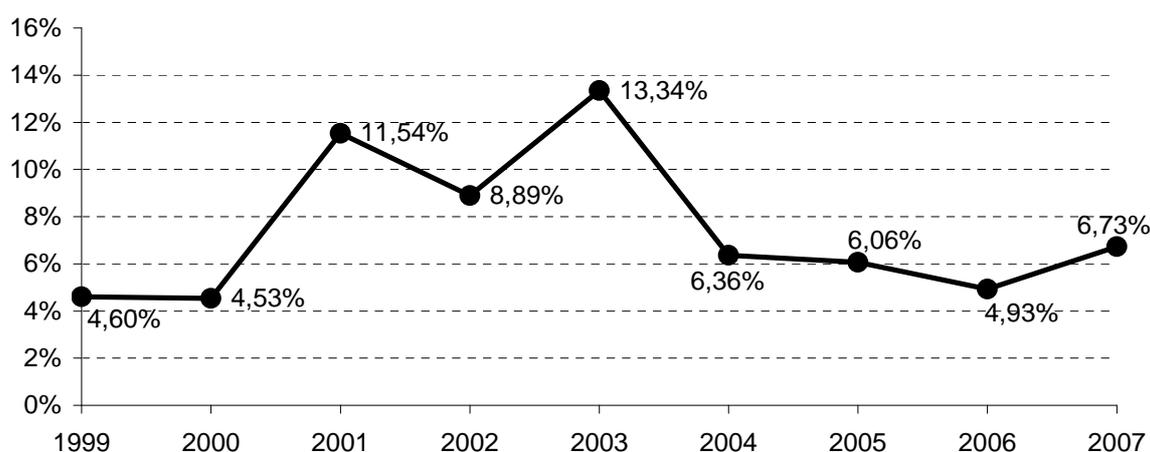
Company	Dividend yield
čez	3,85%
energoaqu	5,76%
Erste group	1,11%
jm plynárenská	7,81%
kb	4,73%
philip morris	11,51%
pr.energetika	7,74%
pr.plynárenská	4,53%
rm-s holding	3,16%
slezan fm	2,39%
sm plynárenská	5,55%
telefonica	9,39%
vč plynárenská	8,20%
zentiva	0,94%

Source: Author's calculations based on data from www.pse.cz, ipoint.cz

During 1999 – 2007 the Philip Morris ČR has the highest dividend yield in the Czech Republic in average 11,51%, succeeded by Telefónica.⁴⁰ Philip Morris ČR pays out for shareholders a whole net profit and very attractive dividend for a long period, Telefónica has a high dividend yield in the last years. On the opposite side was placed Zentiva with average dividend yield lower than 1%. The summary of dividend yield for our companies is shown in the table 6.

We calculate also average annual dividend yield for all the companies which paid out dividend in given year, our conclusion can be seen in figure 11. There are evident two bigger jumps in year 2001 and 2003 but they are caused by two companies – RM-S holding (2003) and Energoaqua (2001), which paid a high dividend. The dividend yield of RM-S holding in 2003 was about 77%, due to super-dividend, with a view to pay out partnership of investors (who hold 97,5% of companies shares) before the next restructuralisation of the company. Very similar was the situation in Energoaqua. When we excluded these two outliers we get the figure 12. We can see increase from 1999 to 2002 and slow decrease of dividend yield after it but in 2007 there is again quit growth.

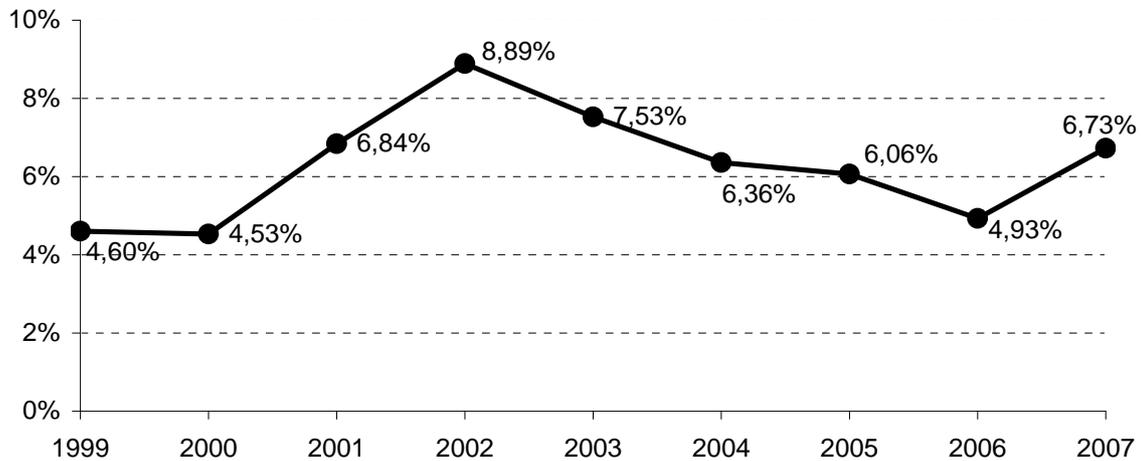
Figure 11: Development of average dividend yield in time



Source: Author's calculations based on data from www.pse.cz, ipoint.cz

⁴⁰ After we excluded the Energoaqua in year 2001 and RM-S holding in year 2003.

Figure 12: Development of average dividend yield in time without two outliers



Source: Author's calculations based on data from www.pse.cz, ipoint.cz

Using a correlation coefficient we searched also for relationship between abnormal returns and dividend yield. Correlation, measured as a correlation coefficient, indicates the strength and direction of a linear relationship between two random variables. The correlation coefficient between two random variables X and Y is defined

$$\text{as: } \text{corr}(X, Y) = \frac{\text{cov}(X, Y)}{\sigma_X \sigma_Y} = \frac{E((X - \mu_X)(Y - \mu_Y))}{\sigma_X \sigma_Y}, \quad \text{where Cov means}$$

covariance⁴¹, $\sigma_X \sigma_Y$ are standard deviations, μ_X, μ_Y are mean values and E is the expected value operator.

The correlation is defined only if both of the standard deviations are finite and nonzero. The correlation cannot exceed 1 in absolute value and the maximal values are 1 (an increasing linear relationship) and -1 (decreasing linear relationship). If the variables are independent, then the correlation is

⁴¹ Covariance is a measure of how much two variables change together. If two variables tend to vary together, then the covariance between the two variables will be positive. On the other hand, when one of them is above its expected value the other variable tends to be below its expected value, then the covariance between the two variables will be negative.

0.⁴² The closer the coefficient is to either -1 or 1 , the stronger the correlation between the variables.

To calculate the correlation we use the abnormal returns and dividends from interval $[-10;10]$ around record date. There is an evident negative correlation between these variables, except year 1999. The highest dependence is in year 2002, following by 2006. These conclusions are a little bit surprise, we would expect positive correlation. We expect that the abnormal return increases as the dividend increases. The positive relationship between dividend yields and excess returns would be consistent with the dividend-related tax motivated trading.

Moreover, from figure 13 we can see that the abnormal returns are significantly lower than dividend yields. But this difference can be created by logarithm form of returns which we used to compute abnormal returns.

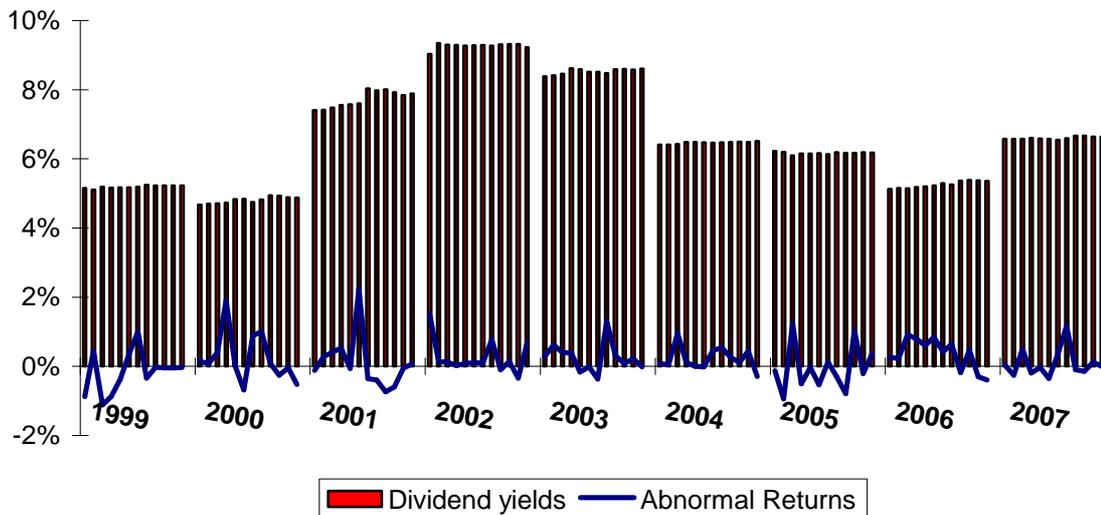
Table 7: Correlation coefficient between abnormal returns and dividend yields

Dividend per Year	Correlation coefficient
1999	0,038
2000	-0,453
2001	-0,279
2002	-0,880
2003	-0,384
2004	-0,329
2005	-0,524
2006	-0,603
2007	-0,235

Source: Author's calculations based on data from www.pse.cz, ipoint.cz

⁴² The converse is not true.

Figure 13: The relationship between abnormal returns and dividend yields



Source: Author's calculations based on data from www.pse.cz, ipoint.cz

We are aware of the fact that we use for finding the relationship between two variables only one index, what is the correlation coefficient which speak only about linear relationship. From these reason there is restricted predictive power of our results. We can try to divided the companies on 3 groups according to dividend yield and then calculate the abnormal returns for individual group.

Table 8: Abnormal returns and Dividend yields sorted by dividend yields

	group 1	group 2	group 3
dividend yield	3,47%	4,74%	8,31%
abnormal return	0,11%	0,21%	0,19%

Source: Author's calculations based on data from www.pse.cz, ipoint.cz

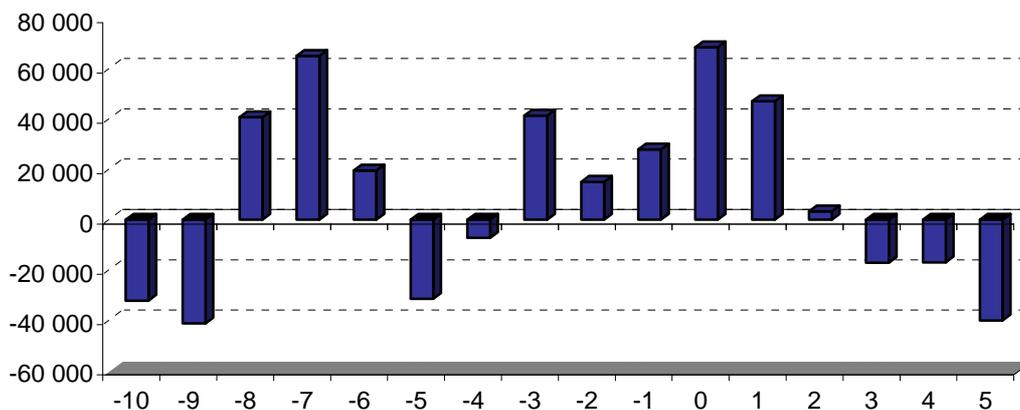
In accordance with previous conclusion we found no evidence that lower dividend yield would be consist with smaller abnormal returns due to relatively high transaction costs. For the first two groups the abnormal return increases as the dividend increases, but in the third group we observe decrease of abnormal returns. The third group has the highest dividend yield and should be attract, but the abnormal return is only 0,19%.

Volume

We also analyze volume data and compute abnormal volume as the deviation from the average daily volume. We first compute average number of shares traded during the period from 200 to 11 days before the record day for each security and then subtract this mean from the volume for each day in the event window.

We can expect higher than usual trading volume around ex-dividend day, what means significant positive excess volume. Our expectation is supported by standard theory that taxpaying investor would sell before an ex-dividend date to avoid dealing with the dividend and buy afterward, as was mentioned above. Moreover, positive abnormal volume would signal that there are no market frictions that impede arbitrage activity. Our results are in table 9 and figure 14.

Figure 14: Abnormal volume around record date



Source: Author's calculations based on data from www.pse.cz

Table 9: Excess volume around record date

day	excess volume
-10	-32212
-9	-41259
-8	40713
-7	65085
-6	19533
-5	-31503
-4	-7237
-3	41364
-2	15032
-1	27889
Record date	68538
1	47064
2	3280
3	-17148
4	-16967
5	-40046

Source: Author's calculations based on data from www.pse.cz

Our results show a positive excess volume around -7, -2 and 0 day. These days are the record date and ex-days (how was mention above, ex-dividend day is -2 but some companies use the right to stop settlement, what means that ex-dividend day is in average 7 days before record date). Excess volume around these days may indicate a specific trading motivation such as dividend capture. But it may also indicate tax realization strategies or bad specialization of estimation or event windows.

We also arranged the excess volume by average volume (we use average volume as a proxy for liquidity). If dividend capture occurs, we expect excess volume to be positively related to average volume. We divided our companies by an average volume to 3 groups and computed excess volume. The companies in the first group are traded sporadically and the average volume is only 4 shares per day, second group consists of 3 companies Philip Morris, RM-S holding and Erste group bank with average volume 2172 shares

per day, and the highest average volume 693 295 is connected with 3 group (ČEZ, KB, Telefonica, Zentiva). Our results are in table 10.

Table 10: Excess volume around record date sorted by average volume

day	group 1	group 2	group 3
-10	-3	5 892	-153 080
-9	-4	-417	-220 398
-8	-4	10 317	188 336
-7	-4	-2 462	296 438
-6	-3	10 740	45 264
-5	-3	7 126	-196 445
-4	-3	4 125	-75 026
-3	-4	5 095	144 320
-2	-2	3 635	39 920
-1	-3	9 802	90 057
Record date	-4	1 904	309 990
1	-4	-181	196 963
2	-4	-2 159	-10 191
3	-4	4 128	-69 035
4	-4	5 501	-76 907
5	-4	524	-185 947

Source: Author's calculations based on data from www.pse.cz

For group 1, there is a negative excess volume for every period around record date. Due to a very sporadic trading with shares of companies, this conclusion has little predicative power. In most cases there was no deal around record date.

The groups of higher average volume have positive excess volume on record date and also around ex-dividend day (we consider ex-dividend day as 2 days before record date). The most companies from third group have ex-dividend day more than 2 days before record date (mostly 7 days) contrary to other two groups. That can be a reason, why group 3 has positive excess volume around -7 day. Moreover, higher average volume is connected with higher excess volume.

Our results confirm our expectations of higher trading volume around record and ex-dividend day.

The GM and ED

The GM and ED are the dummy variable, for special days.

The variable GM acquires the value of one if the general meeting took place in this day, zero otherwise. The general meeting is also the date of record for most of our companies which we researched.

The variable ED acquires the value of one in the ex-dividend date, zero otherwise.

3.2.2. RESIDUAL ANALYSIS

Also we have to implement residual analysis. There is necessarily to test autocorrelation, homoskedasticity and normality of disturbances.

Autocorrelation

When $Corr(u_t, u_s) = 0$ for all $t \neq s$ is false, we say that the errors suffer from autocorrelation, because they are correlated across time. We should remind that the autocorrelation assumes nothing about temporal correlation in the independent variables. Moreover, the autocorrelation is only an issue in time series regressions. Under random sampling, u_i and u_j are independent for any two observations i and j .

If we discover the autocorrelation of disturbances, we would have to modify regression or use another method than OLS due to inefficient of estimates. The estimates by OLS would not be best linear unbiased estimator (BLUE).

We use Durbin-Watson to test first order autocorrelation of disturbances. The value of Durbin-Watson statistic lies between 0 and 4. A value of 2 indicates no autocorrelation. If the Durbin-Watson statistic is substantially

less than 2, there is evidence of positive correlation between error terms. On the other hand the Durbin–Watson statistic substantially higher than 2 indicate negative correlation, that means successive error terms are much different in value to one another. If the p-value of Durbin-Watson is higher than 0,05, we can not reject the null hypothesis about non-autocorrelation disturbances on 5% significance level and we can use our model and OLS method.

Normality

The assumption of normality is that the error u is independent of the explanatory variables and is normally distributed with zero mean and variance σ^2 : $u \sim \text{Normal}(0, \sigma^2)$. A normally distributed random variable is symmetrically distributed about its mean, it can take on any positive or negative value (but with zero probability), and more than 95% of the area under the distribution is within two standard deviations. The normality plays no role in the unbiasedness of OLS, nor does it affect the conclusion that OLS is the best linear unbiased estimator under the Gauss-Markov assumptions. But t and F statistics do not have t and F distributions. Fortunately, in large sample sizes the normality of the OLS estimators is still approximately true even without normality of the errors.⁴³ So t and F statistics have approximately t and F distributions and we are able to obtain critical values or p -values. But there are no general prescriptions on how big the sample size must be before the approximation is good enough. Some econometricians think that 30 observations are satisfactory, but this cannot be sufficient for all possible distributions of u . (Wooldridge, 2000)

To decide about normality of disturbances we use Jarque-Bera test, based on the sample kurtosis and skewness. The null hypothesis is that the residuals come from a Gaussian or normal distribution. If the p-value in Jarque-Bera test is lower than 0,05, we reject the null hypothesis of normal distribution at the 5% significance level and we can not suppose the normal distribution of disturbances.

⁴³ To hold it, there is required the homoskedasticity assumption.

Homoskedasticity

The assumption of homoskedasticity states that the variance of the unobservable, u , conditional on x , is constant. $Var(u | x_1, x_2, \dots, x_n) = \sigma^2$. σ^2 is often called the error variance or disturbance variance and the square root of σ^2 , σ is the standard deviation of the error.

The homoskedasticity assumption plays no role in showing whether OLS is unbiased or consistent. However, OLS no longer has the smallest variance among linear unbiased estimators in the presence of heteroskedasticity (If the errors do not have constant variance, we say they are heteroscedastic, that means that $Var(u | x)$ depends on x). The usual OLS t statistics do not have t distributions (F statistics are no longer F distributed) in the presence of heteroskedasticity, and the problem is not resolved by using large sample sizes. The statistics we used to test hypotheses under the Gauss-Markov assumptions are not valid in the presence of heteroskedasticity. That means OLS is no longer BLUE and no longer asymptotically efficient in the class of estimators. If we suspect heteroskedasticity, then the OLS standard errors are invalid and some corrective action should be taken. (Wooldridge, 2000)

To test the homoskedasticity (the errors have constant variance) of disturbances we implement regression of square of residual, gained by OLS method, on square of fitted value (because we don't know disturbances squared). Fitted value is our explanation variable: $AR_t = \hat{\alpha} + \hat{\beta}_1 DY_t + \hat{\beta}_2 GM_t + \hat{\beta}_3 ED_t + \hat{\beta}_4 EXVOL_t$ ⁴⁴ The subsidiary regression is: $\hat{u}^2 = \delta_0 + \delta_1 \cdot (AR)^2 + error$.⁴⁵ We test the hypothesis that $(AR)^2$ is insignificant ($H_0 : \delta_1 = 0$) against alternative that it is significant ($H_1 : \delta_1 \neq 0$). If the p-value is higher than 0,05, we can not reject the null hypothesis on 5% significance level, so we don't reject the homoskedasticity of disturbances.

⁴⁴ The $\hat{\alpha}, \hat{\beta}_1, \hat{\beta}_2, \dots, \hat{\beta}_4$ are gained by OLS method.

⁴⁵ In TSP this test is termed as LM het. test.

3.2.3. OUR RESULTS

We are aware of the fact that predictive power of our results and our conclusions is restricted. There is only a short period, when the dividend was payout in the Czech Republic and also the market is not enough developed, so we didn't have all information of all companies which we needed and there is also low liquidity of securities for some companies. Moreover, we did not exclude some influence, as inflation, transactions costs, tax or monetary policy and so on.

Transaction costs connected with dividend are for instance necessity to discount dividend value to record date (time period between record date and payment date is usually few months in the Czech Republic) or transaction cost connected with dividend payments and so on. There exist more opinions on relevancy of transaction costs. For instance, Karpoff and Walkling (1988) found that excess ex-day returns are positively related to transactions costs and transaction costs affect pricing and must be taken into account in empirical testing of ex-day price behaviour. On the other hand Elton and Gruber (1970) assumed that transactions costs can be ignored.

Also the bid-ask spread might affect our results. In accordance with Campbell and Beranek (1955) the price difference between the opening sale on the ex-dividend date and the last sale on the preceding day tends to be definitely larger than the differences between the average prices of the two days. This is probably accounted for the automatic reduction of open bids on the morning of the ex-dividend date, which leaves the market vulnerable until a normal flow of new bids takes over later in the day. Unfortunately, we don't have the requisite data to measure the spread.

When we implement OLS method in TSP we gained various results. Our complete results are given in Appendix, summary follows in next articles.

For ČEZ, Erste group bank, KB, Philip Morris, Pr. Energetika, Pr. Plynárenská, Slezan Frýdek Místek and Telefónica we can not reject the null hypothesis about non-autocorrelation and homoskedasticity of

disturbances on 5% significance level and we can use our model and OLS method. But we reject the null hypothesis of normal distribution at the 5% significance level.

For Energoaqua, Rm-S holding, Sm. Plynárenská, Vč. Plynárenká and Zentiva we can not reject the null hypothesis about homoskedasticity of disturbances on 5% significance level. But we reject the null hypothesis about non-autocorrelation and also normal distribution of disturbances at the 5% significance level.

For JM Plynárenská we reject all null hypotheses about non-autocorrelation, homoscedasticity and also normal distribution of disturbances at the 5% significance level.

Due to fact about normality mentioned above, we will simply use the t statistics without worrying about the normality assumption.

Also we have to mention very low coefficient of determination R^2 which was for our models between 0,1 and 0,2. The value of R^2 gives some information about the goodness of fit of a model and so low value as 0,1 indicates a poor fit of the OLS line. But when we use real data, low R^2 in regression equations are not uncommon, especially for cross-sectional analysis. Seemingly low R^2 does not necessarily mean that an OLS regression equation is useless.

For the companies, where we can not reject the homoskedasticity and non-autocorrelation of disturbances we can exclude insignificant variables, that means variable with p-value higher than 0,05. We exclude only one variable with highest p-value and than we make again OLS regression, and again exclude the variable with highest p-value till the moment when stay only variables with p-value lower than 0,051. After we excluded all insignificant variables (exception absolute part) stay these models:

Table 11: Results for ČEZ

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.684098 \cdot 10^{-3}$	-0.471218	0,638
ED	0.013181	2,26980	0,025

Table 12: Results for KB

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	- 0.101608	-1.30372	0,196
DY	2.62855	2.10000	0,038

Table 13: Results for Telefónica

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.40653 \cdot 10^{-2}$	1.91014	0,060
EXVOL	$0.464506 \cdot 10^{-8}$	1.92241	0,050

Table 14: Results for Philip Morris

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.599788 \cdot 10^{-2}$	2.79042	0,006
EXVOL	$0.172001 \cdot 10^{-5}$	2.95821	0,004

For companies where we reject the null hypothesis about non-autocorrelation of disturbances following Durbin-Watson test and we accept the alternative of $AR(1)^{46}$ process in disturbances we use GLS⁴⁷ (generalized least squares) method side of OLS. It is not unusual to find autocorrelation when we used daily observations, but we can not use OLS method. If we use OLS method with autocorrelation of disturbances, the p-value of our variables is undervalued and we incorrectly exclude the variables from our model and the conclusions are wrong. The estimator gained by FGLS is more efficient and the FGLS test statistics are at least asymptotically valid.

⁴⁶ $AR(x)$ is autoregressive process of x order. It is a type of random process. $AR(1)$ is autoregressive process of first order: $u_t = \alpha + \beta u_{t-1} + v_t$

⁴⁷ Or FGLS (feasible generalized least squares)

Estimation by FGLS method is based on transformation of variables in original regression with using of new parameter and the following estimation through the use of OLS. There are several names for FGLS estimation of the AR(1) model that comes from different methods of estimating and different treatment of the first observation. We use Cochrane-Orcutt estimation.

After we used GLS method, we can exclude insignificant variables, it means variables with p-value higher than 0,05. Our results after we excluded all insignificant variables (exception absolute part) are in following tables:

Table 15: Results for RM-S Holding

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.605812 \cdot 10^{-2}$	1.08455	0,278
GM	-0.023745	-2.59761	0,009
RHO	0.521692	5.10192	0,000

Table 16: Results for Sm plynárenská

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$-0.286530 \cdot 10^{-3}$	-0.171661	0,864
EXVOL	$-0.146531 \cdot 10^{-2}$	-2.52236	0,012
RHO	0.284398	2.56280	0,010

Table 17: Results for Vč Plynárenská

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.105072 \cdot 10^{-2}$	4.02363	0,000
EXVOL	$0.556112 \cdot 10^{-3}$	1.93015	0,045
RHO	0.175569	2.64729	0,008

Table 18: Results for Zentiva

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.760293 \cdot 10^{-2}$	.981018	0,327
ED	-0.037352	-3.69225	0,000
EXVOL	$-0.460117 \cdot 10^{-7}$	-3.77861	0,000
RHO	0.615545	4.88744	0,000

For last company, Jm plynárenská, where we reject all null hypotheses about non-autocorrelation, homoscedasticity and also normal distribution of disturbances at the 5% significance level we have to use alternative test then OLS. If heteroskedasticity is present then the standard error is not valid for constructing confidence intervals and OLS method is no longer BLUE. In addition, OLS is not longer asymptotically efficient. So there is the same problem as with autocorrelation. It means we incorrectly exclude the variables from our model and the conclusions are wrong. We use the heteroskedasticity-robust standard errors, these errors are usually attributed to White. The application of heteroskedasticity-robust methods is not difficult because TSP can compute it very easy. We use GLS method for elimination autocorrelation and White robust standard error for elimination heteroskedasticity. Then we can gradually exclude the insignificant variable. Enclosed our table for JM plynárenská after we excluded all insignificant variables:

Table 19: Results for Jm plynárenská

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.835378 * 10^{-3}$	0.239926	0,810
EXVOL	$0,782077E * 10^{-3}$	7.11223	0,000
RHO	0.451865	23.6709	0,000

3.2.4. INTERPRETATION OF OUR RESULTS

With interpretation of our results we have to bear in mind the assumption of ceteris paribus. Most of variables are not significant. For the company ČEZ is the only one significant variable ex-dividend date, for KB dividend yield, for RM-S holding general meeting and for Telefónica, Jihomoraská plynárenská, Severomoravská plynárenská, Východočeská plynárenská and Philip Morris excess volume. Only for Zentiva we found two significant variables: ex-dividend date and excess volume. For Slezan Frýdek Místek, Erste group, Pražská Plynárenská, Energoaqua and Pražská

Energetika we found no significant variables. To enable see the results transparently, we created the table 20. Blank cells mean the insignificant variable. The sign marks the influence, + is positive (with increase of variable increase also abnormal return) - is negative (with increase of variable decrease of abnormal return).

Table 20: Results - significant variables for monitored companies

Company	DY	GM	ED	EXVOL
čez			+	
energoaqu				
Erste group				
jm plynárenská				+
kb	+			
philip morris				+
pr.energetika				
pr.plynárenská				
rm-s holding		-		
slezan fm				
sm plynárenská				-
telefonica				+
vč plynárenská				+
zentiva			-	-

The excess volume is significant in most of the samples. But mostly is less than one half. Other variables seem to be insignificant. We can see that the excess volume is in more examples positive, what means that with higher excess volume is higher also abnormal return. But the coefficients for excess volume are very low, so there is only small dependence between abnormal return and abnormal volume.

The ex-dividend day is significant only for ČEZ and Zentiva, every time with different sign. The negative sign for ex-dividend day is in case of Zentiva surprising, but also the second significant variable (excess volume) for Zentiva is negative and unexpected. These conclusions for Zentiva are not

confident because of very low dividend (the lowest average annual dividend yield) and low frequent of dividend payments. The dividends have been paid since year 2005 what means only three times in our observations.

Dividend yield is significant in one example with positive sign. This conclusion is in violation of our early findings, that there exists a negative correlation between abnormal returns and dividend yield. But this conclusion confirms our expectation mentioned above.

General meeting is also significant only in one sample with negative sign. This can look like unexpected conclusion but we consider all general meetings during this period, that means also meetings, where was announced that there will be no dividend payout. Especially for RM-S holding were not the dividend payouts every year but only in years 2000, 2002 and 2004. Moreover, on this day was also published the trading income of previous year and other important events, which can have a negative impact on price of share. So the negative sign means that the abnormal returns decrease in the day of general meetings due to unfavourable announcement (which doesn't have to be connected only with dividends).

To sum up our conclusions, as most significant part which influences abnormal returns is abnormal volume, but this conclusion does not have to do anything with dividends. Other variable seems to be insignificant. We find no evidence of significant impact of dividend payout on firm value.

*"I don't want a lot of good investments; I want a few outstanding ones."
Philip Fischer*

4. SHARE REPURCHASE (STOCK BUYBACK)

There exists an alternative to the dividend, what is a share repurchase, a possibility for corporations to buy back their own shares. The share repurchase has the same function as a dividend that means to distribute cash to existing shareholders. Thus, we observe that the outstanding equity of the company is reduced in a share repurchase. The share repurchases can have time span months or even years. There are, however, daily buy-back limits which restrict the amount of stock that can be bought over a particular time interval.

The firm either retires the shares and lowers authorized capital or keeps them as treasury stock, available for re-issuance.

In the USA the popularity of share repurchase started in the half of eighties of the last century and a really boom was in the second half of nineties. In Europe the development of stock buyback was delayed, but in the time it is a standard operation. In the Czech Republic, there are only few companies using share repurchases, best known are ČEZ or Komerční banka. For instance general meeting of ČEZ decided that ČEZ can till 23rd of April 2007 repurchase their own shares in volume, which can not be higher then 59 221 084 shares. The lowest price, at which ČEZ can buy their shares, is CZK300 per share and the highest is CZK2 000 per share. The time, when the company can buyback their shares is 18 months of the date when the general meeting took place.

When we talk about a common stock repurchase and dividend payments we should keep in mind that both have differences.

The advantages of share repurchase⁴⁸

For shareholders

The tax benefit is the biggest advantage of share repurchase against dividends. For instance in the USA the dividends are taxed higher rate than the capital gains. Though, the stock buyback are most popular also in countries, where capital gains are taxed same or higher rate than dividends. The reasons can be as follows:

While repurchase own shares leads to an increase of a price of share⁴⁹, dividend payouts decrease market value through decrease of market price. But the main difference is that investor can decide if they take advantage of share repurchase or not. Investor is not bounded by the level of dividend, which was announced by general meeting. On the other side, we can not omit high transaction costs connected with selling of shares.

With presumption of stable P/E ratio (price per share dividend by earnings per share), the share repurchase is connected with higher net earnings per share and than higher stock price. But this is true only if the positive change of the capital structure is reached, that means approximation of the debt/capital ratio more to the optimal level.⁵⁰ If this is not true, than the P/E ratio should decrease.

Other advantage can also be that the share repurchase are liable to supervision authority of ČNB (independent if it is about listed shares), which has opportunity to use sanction in case of breach of the law. Also a small breach of the law / mistake can mean a high sanction. This point can be a negative point of the procedure for company.

For issuer (company)

Cutting dividends is considered to very embarrassing for companies. So, rather than to pay out larger dividends during periods of excess profitability then to have to reduce them during leaner times, companies

⁴⁸ www.finexpert.cz

⁴⁹ Though, the market value is decreased due to lower volume of share in circulation.

⁵⁰ That is for instance example of ČEZ.

prefer to pay out a conservative portion of their earnings. Share repurchase is a good opportunity to distribute cash to the shareholders without management obligation of long-term dividend payouts. And also do not create expectations of repeated share repurchase⁵¹.

Moreover, the share repurchase can have a long duration (usually number of months) so the company can decide the day, volume and also the price for buying of their own shares. The firms can flexible react on the actual market condition and in the extreme case they do not need to realize the stock repurchase.

The share repurchase can also improve the economic picture about company due to a stabilization of a share quotation or due to a change of unsatisfactory ratio of shareholders' equity and debt. For instance when there is a long-term decrease price of share, the share repurchase can cut back or even temporarily stop this decrease. In addition if the firm owns a high number of options, then the management will prefer stock repurchase to dividend payout. When a company repurchases its own shares, it reduces the number of shares held by the public so, even if profits were to remain the same, this would have the effect of increasing earnings per share⁵². So, repurchasing shares, particularly when a company's price of share is undervalued or depressed, can provide a competitive return on investment.

Summarization of above mentioned facts, Dividends and Share Repurchases are alternatives to return of the cash to the shareholders. In spite of the fact that the stock buyback has more advantages then dividends, we can not expect a total destruction of dividends. Specially, in some sectors the stable dividend policy is a matter of fact. So dividends and share repurchases can live side-by-side, sometimes may be preferred by corporations dividends payout and sometimes by stock buyback.

⁵¹ Of course there is also possibility to solve this situation by superdividend.

⁵² Earnings per share (EPS) are the earnings returned on the initial investment amount.

*"Rule No.1: Never lose money. Rule No.2: Never forget Rule No.1."
Warren Buffett*

5. SUMMARY AND CONCLUSION

In our diploma thesis we seek to research the dividends from more views. We started with short introduction to the basic about dividends, especially types of dividends, process of declaration and payments, dividend-paying methods we also discussed pro and con dividends and the determinants which can influence the dividends. In the last theoretical part we made a briefly mention of evolution of dividend policy and also the short development of dividend policy in the Czech Republic.

The main part was devoted to the issue of dividend policy in the Czech Republic and its impact on the firm value. We analyzed dividend-payout companies listed on Prague Stock Exchange in the 1999–2007. This was not easy work. In my best knowledge, this is one of the first empirical researches of dividend policy in the Czech Republic. This emerge as a problem especially with finding a necessary data as record date, ex-dividend day or to find all companies which paid dividends. Also we can not confront our results with another study in the same country. On the other side there is some added value of our work for dividend policy in the Czech Republic, even if our conclusions don't give support to results gained for instance in the USA.

In the first part we used the event studies, based on observing the abnormal returns to shareholders around the record day, to evaluate the influence of dividend in terms of value creation for shareholders. We mentioned theoretical principal of event studies and of course methodology and applied on our data for the Czech Republic. Then we regressed abnormal returns against relevant explanatory variables. And we made an analysis of some of explanatory variables, as volume and dividend yield, and of course that we could not omit the analysis of residuals.

We are aware of the fact that our results and our conclusions are restricted. There is only a short period, when the dividend was payout in the Czech Republic and also the market is not enough developed, so we didn't

have all information for all companies which we needed. Majority studies which research the dividend policy has been analyzed for developed countries or countries that have much more developed financial markets and legal systems. Moreover, we did not exclude some influence, as inflation, transactions costs, tax or monetary policy and so on. But in the face of this restriction we obtained several interesting results by modelling the behaviour of dividends, let's sum up them here.

Abnormal returns - We observe positive excess returns on and before the ex-dividend day (-2 day) and negative excess return after ex-dividend day. We found for CARs both positive and negative market evaluation of record date, but the results were mostly not significantly different from zero. The t-test confirmed statistical significance of positive returns in longer intervals and no significant value was proved just around the record date. The most significant was interval [-10;0].

Dividend yield - The highest dividend yield in ČR during 1999 – 2007 has Philip Morris ČR in average 11,51%, succeeded by Telefónica. On the opposite side was placed Zentiva with average dividend yield lower than 1%. Dividend returns of PX index have been rather stable during 1999-2007, the total returns have been instable from year to year. The dividend returns have been only small part of the total returns, on average it has been about 1%. The correlation between abnormal returns and dividend yield is surprisingly negative.

Volume - Our results show higher than usual trading volume around record and ex-dividend days, what means significant positive excess volume. We also confirm our expectation that excess volume is positively related to average volume.

The next step is the regression analysis of abnormal returns. Explanatory variables are dividend yield, abnormal volume and two dummies - ex-dividend day, and day when the general meeting takes place. With using of OLS method and for some companies also GLS method and heteroskedasticity-robust standard error we gained significant variables for our models. As the most significant variable we found excess volume, other variables were in most of cases insignificant. The excess volume was in most

cases with positive sign, so with higher abnormal volume we can expect higher abnormal returns.

But our main question is, if the dividend policy influences the price of share. When I summarize all our results I am afraid that our results don't give support of the USA studies. In the case of the Czech Republic we found no evidence of significant impact of dividend on firm value.

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TSP

Appendix

Our results gained by OLS method in TSP:

Table 21: ĆEZ

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.259797 * 10^{-3}$	0.060901	0,952
DY	-0.028123	-0.297622	0,767
GM	$0.844521 * 10^{-2}$	0.641279	0,523
ED	$0.388224 * 10^{-2}$	2.29857	0,023
EXVOL	$-0.395602 * 10^{-9}$	-0.320841	0,683

Test	Value of statistic	P-value
Durbin-Watson	1.96992	0,598
Jarque-Bera	153,221	0,000
LM	0.166301	0,683

We can not reject the null hypothesis about non-autocorrelation and homoskedasticity of disturbances on 5% significance level and we can use our model and OLS method.

But we reject the null hypothesis of normal distribution at the 5% significance level.

Table 22: Energoaqua

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$-0.521966 * 10^{-3}$	-1.74582	0,081
DY	$0.202975 * 10^{-3}$	.140037	0,889
GM	$0,184888 * 10^{-3}$	.021701	0,983
ED	$0,144609 * 10^{-2}$	.268179	0,789
EXVOL	$0.123169 * 10^{-6}$	.251056	0,802

Test	Value of statistic	P-value
Durbin-Watson	1,22977	0,000
Jarque-Bera	223.80009	0,000
LM	.023076	0,879

We can not reject the null hypothesis about homoskedasticity of disturbances on 5% significance level.

But we reject the null hypothesis about non-autocorrelation and also normal distribution of disturbances at the 5% significance level.

Table 23: Erste group bank

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$-0.105238 * 10^{-2}$	-0.290798	0,775
DY	-0.661733	-0.839811	0,415
GM	$0.436447 * 10^{-3}$	0.041164	0,968
ED	$-0.177215 * 10^{-2}$	-0.127703	0,900
EXVOL	$-0.705218 * 10^{-7}$	-1.51389	0,152

Test	Value of statistic	P-value
Durbin-Watson	2.39607	0,955
Jarque-Bera	6.25657	0,044
LM	0.142098	0,706

We can not reject the null hypothesis about non-autocorrelation and homoskedasticity of disturbances on 5% significance level and we can use our model and OLS method.

But we reject the null hypothesis of normal distribution at the 5% significance level.

Table 24: JM Plynárenská

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$-0.511384 * 10^{-3}$	-0,901653	0,367
DY	$0.645007 * 10^{-2}$	0.963451	0,335
GM	$-.149411 * 10^{-3}$	-0.044331	0,965
ED	$.381401 * 10^{-3}$	0,113164	0,910
EXVOL	$0.189553 * 10^{-3}$	1.51984	0,129

Test	Value of statistic	P-value
Durbin-Watson	1,13816	0,000
Jarque-Bera	5130.05	0,000
LM	6.74198	0,009

We reject all null hypotheses about non-autocorrelation, homoscedasticity and also normal distribution of disturbances at the 5% significance level.

Table 25: KB

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	-0.107399	-1.31743	0,191
DY	2.62868	2.05852	0,042
GM	0.054119	0.163638	0,870
ED	0.144595	1.04413	0,299
EXVOL	$-0.107252 \cdot 10^{-6}$	-0.385250	0,701

Test	Value of statistic	P-value
Durbin-Watson	2,15834	0,887
Jarque-Bera	8223,63	0,000
LM	3,24715	0,072

We can not reject the null hypothesis about non-autocorrelation and homoskedasticity of disturbances on 5% significance level and we can use our model and OLS method.

But we reject the null hypothesis of normal distribution at the 5% significance level.

Table 26: Philips Morris

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	0.013889	2.48683	0,014
DY	-0.058196	-1.36558	0,174
GM	$-0.923814 \cdot 10^{-2}$	-1.04051	0,300
ED	$-0.549746 \cdot 10^{-2}$	-0.618874	0,537
EXVOL	$0.199362 \cdot 10^{-5}$	3.23795	0,002

Test	Value of statistic	P-value
Durbin-Watson	2.10595	0,842
Jarque-Bera	350.733	0,000
LM	1.47442	0,225

We can not reject the null hypothesis about non-autocorrelation and homoskedasticity of disturbances on 5% significance level and we can use our model and OLS method.

But we reject the null hypothesis of normal distribution at the 5% significance level.

Table 27: Pr. Energetika

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.539615 \cdot 10^{-3}$	0.160505	0,873
DY	$-0.439247 \cdot 10^{-2}$	-0.108849	0,913
GM	$0.136391 \cdot 10^{-3}$	0.030864	0,975
ED	$-0.400953 \cdot 10^{-2}$	-0.944878	0,346
EXVOL	$-0.924664 \cdot 10^{-4}$	-0.548056	0,585

Test	Value of statistic	P-value
Durbin-Watson	2.10438	0,842
Jarque-Bera	4197.78	0,000
LM	0.246011	0,620

We can not reject the null hypothesis about non-autocorrelation and homoskedasticity of disturbances on 5% significance level and we can use our model and OLS method.

But we reject the null hypothesis of normal distribution at the 5% significance level.

Table 28: Pr. Plynárenská

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0,187072 \cdot 10^{-2}$	1.43079	0,154
DY	-0.034124	-1.54310	0,125
GM	$0.580036 \cdot 10^{-3}$	0.240135	0,811
ED	$0.431899 \cdot 10^{-3}$	0.190837	0,849
EXVOL	$0.581048 \cdot 10^{-3}$	0.706984	0,481

Test	Value of statistic	P-value
Durbin-Watson	1.98326	0,593
Jarque-Bera	19533.7	0,000
LM	3.55543	0,059

We can not reject the null hypothesis about non-autocorrelation and homoskedasticity of disturbances on 5% significance level and we can use our model and OLS method.

But we reject the null hypothesis of normal distribution at the 5% significance level.

Table 29: RM-S Holding

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	0.012081	3.04966	0,003
DY	0.016708	1.29318	0,200
GM	-0.015518	-1.30268	0,197
ED	$-0.383207 \cdot 10^{-2}$	-0.256446	0,798
EXVOL	$0.263312 \cdot 10^{-3}$	3.07918	0,003

Test	Value of statistic	P-value
Durbin-Watson	1.22391	0,002
Jarque-Bera	83.7515	0,000
LM	$0.129025 \cdot 10^{-2}$	0,971

We can not reject the null hypothesis about homoskedasticity of disturbances on 5% significance level.

But we reject the null hypothesis about non-autocorrelation and also normal distribution of disturbances at the 5% significance level.

Table 30: Slezan Frýdek Místek

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.435211 \cdot 10^{-4}$	0,060133	0,952
DY	$0.638344 \cdot 10^{-2}$	0,255812	0,799
GM	$0.478684 \cdot 10^{-3}$	0,265154	0,791
ED	$0.730545 \cdot 10^{-3}$	0,404666	0,687
EXVOL	$-0,711268 \cdot 10^{-5}$	-0,077868	0,938

Test	Value of statistic	P-value
Durbin-Watson	2,01612	0,690
Jarque-Bera	40862.3	0,000
LM	$0,766591 \cdot 10^{-2}$	0,930

We can not reject the null hypothesis about non-autocorrelation and homoskedasticity of disturbances on 5% significance level and we can use our model and OLS method.

But we reject the null hypothesis of normal distribution at the 5% significance level.

Table 31: Sm plynárenská

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.353209 \cdot 10^{-2}$	1.20013	0,232
DY	-0.039780	-1.01537	0,312
GM	$-0.119829 \cdot 10^{-2}$	-0.261912	0,794
ED	$-0.152621 \cdot 10^{-2}$	-0.333593	0,739
EXVOL	$-0.652987 \cdot 10^{-3}$	-1.50751	0,134

Test	Value of statistic	P-value
Durbin-Watson	1.51488	0,008
Jarque-Bera	3129.27	0,000
LM	0.103718	0,747

We can not reject the null hypothesis about homoskedasticity of disturbances on 5% significance level.

But we reject the null hypothesis about non-autocorrelation and also normal distribution of disturbances at the 5% significance level.

Table 32: Telefónica

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.110413 \cdot 10^{-2}$	0,317249	0,752
DY	0.050386	0,973441	0,333
GM	$-0.181615 \cdot 10^{-3}$	-0.015861	0,987
ED	$0.731535 \cdot 10^{-2}$	0,823708	0,413
EXVOL	$0,384615 \cdot 10^{-8}$	1.50355	0,137

Test	Value of statistic	P-value
Durbin-Watson	2,18731	0,904
Jarque-Bera	303.215	0,000
LM	2.08353	0,149

We can not reject the null hypothesis about non-autocorrelation and homoskedasticity of disturbances on 5% significance level and we can use our model and OLS method.

But we reject the null hypothesis of normal distribution at the 5% significance level.

Table 33: Vč Plynárenská

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$0.261328 \cdot 10^{-3}$	0.318049	0,751
DY	$0.438398 \cdot 10^{-2}$	0.458441	0,647
GM	$0.386004 \cdot 10^{-3}$	0.254808	0,799
ED	$0.313580 \cdot 10^{-3}$	0.218809	0,827
EXVOL	$0.277878 \cdot 10^{-3}$	0.755850	0,451

Test	Value of statistic	P-value
Durbin-Watson	1.11238	0,000
Jarque-Bera	20620.1	0,000
LM	0.127129	0,721

We can not reject the null hypothesis about homoskedasticity of disturbances on 5% significance level.

But we reject the null hypothesis about non-autocorrelation and also normal distribution of disturbances at the 5% significance level.

Table 34: Zentiva

Variable	Estimated coefficient	T-statistic	P-value
$\hat{\alpha}$	$-0.481124 \cdot 10^{-2}$	-0.355744	0,724
DY	1.08249	0.731154	0,469
GM	0.012528	0.678002	0,501
ED	-0.031619	-2.11267	0,040
EXVOL	$-0.213930 \cdot 10^{-7}$	-1.38686	0,173

Test	Value of statistic	P-value
Durbin-Watson	1.09436	0,005
Jarque-Bera	15.0912	0,001
LM	0.632313	0,427

We can not reject the null hypothesis about homoskedasticity of disturbances on 5% significance level.

But we reject the null hypothesis about non-autocorrelation and also normal distribution of disturbances at the 5% significance level.