Charles University in Prague
Faculty of Social Sciences

Institute of Economic Studies

DIPLOMA THESIS

2010 **Bc. Margaréta ILKOVÁ**

CHARLES UNIVERSITY IN PRAGUE , FACULTY OF SOCIAL SCIENCES
INSTITUTE OF ECONOMIC STUDIES

TAX-INDUCED TRADING AROUND THE EX-DIVIDEND DATE: EVIDENCE FROM FRANCE

Author: **Bc. Margaréta ILKOVÁ**

Supervisor: **PhDr. Petr Teplý Ph.D.**

Academic year: **2009/2010**

Prohlášení

Prohlašuji, že jsem diplomovou práci vypracovala samostatne 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, May 24, 2010 Bc. Margaréta Ilková

Acknowledgments

At this place I would like to express my gratitude to my professor and teacher PhDr. Petr Teplý Ph.D. for supervising and for valuable comments. All the support from CEFRES is gratefully appreciated. Further thanks belong to my colleagues and friends for vital encouragement and patience. Finally I would like to acknowledge my heartfelt gratitude to my parents for their overall support during all the years of my studies.

Abstract

This diploma thesis examines the trading behavior of investors on the French stock market during the ex-dividend period, between 2003 and 2008. The analysis of the French Tax Code confirms, the capital gains and the dividends are taxed in a different manner, hence the fiscal system creates a tax heterogeneity among different group of stockholders. Consequently, it creates an opportunity for tax-induced trading several days around the ex-date. Our empirical results show significant abnormal trading volumes during the ex-dividend period. The excess trading volumes are the most pronounced in 2003 and 2004, when the investors were heterogeneous not only with respect to the tax rates, but as well with respect to the pre-tax value of dividends. On the other hand, the lowest trading volumes are recorded in 2008 due to equilibration of capital gains and dividend taxation. Putting these three observations together, one may conclude, that in fact, some tax-motivated trading is taking place on the French stock market.

Abstrakt

Táto diplomová práca skúma chovanie investorov na francúzskom akciovom trhu v období ex-dividendy, v rokoch 2003 a 2008. Analýza Francúzskeho daňového zákona potvrdzuje, že spôsob zdanenia dividend a kapitálových ziskov sa líši, teda daňový systém vytvára daňovú heterogenitu medzi rôznymi skupinami akcionárov. Následne tento systém vytvára priestor pre daňovo podnietené obchodovanie niekoľko dní okolo ex-datu. Naše empirické výsledky ukazujú signifikantné abnormálne objemy obchodovania v období dňa ex-dividendy. Nadmerné objemy obchodovania sú najvýraznejšie v rokoch 2003 a 2004, a to v období, keď boli investori heterogénni nielen s ohľadom na daňové sadzby, ale aj s ohľadom na hodnotu dividendy pred zdanením. Na druhej strane, najnižšie objemy obchodovania boli zaznamenané v roku 2008, v dôsledku vyrovnania sa spôsobu zdanenia kapitálových ziskov a dividend. Spojením týchto troch pozorovaní môžeme vyvodiť, že isté daňovo motivované obchodovanie sa v skutku odohráva na francúzskom akciovom trhu.

Table of Contents

List of Figures

List of Tables

1. Introduction

The harder we look at the dividend picture, the more it seems like a puzzle with pieces that just don't fit together.

Black 1976

The effect of taxation for dividend policy analysis is of high interest to academic research as it affects the post tax value of the assets. Investors deciding between dividend and capital gains income should rationally opt for the one which is more tax efficient. The empirical researches document, the differential tax treatment of dividends and capital gains provides intensive stimulus for taxpayers to employ different tax planning strategies. The economic agents may execute mutual gains at government expense, by trading among them around the ex-dividend date (Scholes and Wolfson, 1992).

In most countries the capitals gains are taxed less heavily than dividend payments. Rationally the companies should distribute no dividend from a tax perspective. But the empirical evidence shows that companies are still paying out huge amount of cash in the form of dividends, and in general the dividend payout ratio has not declined over the last years. Much of the empirical literature tried to find the answer and explain the dividend puzzle phenomena. In this research we will take a closer look at explanations related to the fiscal effect, like the model of Brennan (1970), Black and Scholes (1974), or Litzenberger and Ramaswamy (1979, 1980). But the biggest part of the research will be devoted to more "modern" approaches – to the stock price behavior and abnormal volume analysis around ex-dividend dates. Consequently, this study is closely related to the large literature on stock price behavior on ex-dividend day.

The first "modern" studies, following Elton and Gruber (1970), initially concentrated on the implications of tax effects on pricing. These researches, assuming zero transaction costs and more favorable tax treatment of capital gains compared to dividends, showed that the theoretical price drop should be less than the amount of the dividend. The interpretation of Elton and Gruber (1970) on price behavior on ex-day was later on extended in the researches of Miller and Scholes (1982), Kalay (1982), Lakonishok and Vermaelen (1983),

Lakonishok and Vermaelen (1986), Michaely and Vila (1995), Michaely and Murgia (1995), Liljeblom et al. (2001) etc., who focused on investor's motivation to trade during the ex-dividend period and the impact of this activity on prices and volume.

The Elton Gruber model (1970) represents the static dividend clientele model or buy-and-hold model. In these models the equity-holders are allowed to trade only once, either cum-dividend or ex-dividend. If an investor values capital gains more than dividends he should sell the share cum-dividend. Contrary the investor with dividend preference should be on the buy side. Both under the assumption the investors are rational and they are maximizing their wealth = minimizing taxes. In the dynamic clientele models the shareholders may trade more than once. If they can do so, their tax liabilities may be decreased even further (Allen and Michaely, 2002). The basic idea of dynamic models or dynamic tax induced trading models is that the stockholders may change their trading pattern during the ex-dividend period to avoid or capture the upcoming dividend payment. As consequence the dividend paying share will finish in the hands of those who are taxed the most favorably on dividend income. The reverse transactions will take place after the ex-dividend date. This is why these strategies are in some literature denoted as ex-dividend strategies.

Hundreds of ex-dividend studies have been conducted. The biggest part of them deals with the ex-dividend price anomaly. On the other hand, a large number of ex-date studies have been devoted to the trading volume behavior around the ex-dividend day. Most of them have found an abnormal trading volume occurring around the ex-day: 36% higher abnormal volume during ex-dividend period is reported by Lakonishok and Vernalaen (1986), 25% by Michaely and Murgia (1995) or two times higher volumes may be found in Sander's research (2007). The researchers explained this phenomenon by the use of tax arbitrage strategies.

However, the evidence from France is very limited and out-of-date (in the Table 24 in the appendix one can find an overview of the ex-dividend studies conducted all over the world). This research aims to fill-in the gap by investigating how the taxation aspects affect the trading behavior of investors around the ex-dividend date, on the French stock market, on NYSE-EURONEXT.

Analyze of the Code Général des Impôts (French Tax Code) confirms, that the French tax law treats the taxation of dividends and capital gains in different manner, hence it creates

tax heterogeneity among different groups of investors. Consequently the investors have a strong motivation to trade during the dividend period in order to reduce their tax base.

The French dividends until 2005 carried a tax credit, or "avoir fiscal", that made the dividend worth 50% (10%) more to a taxable French individual resident (a taxable French legal entity) than to the foreign stockholder or to the tax-exempt entity. The tax legislation of other countries did not recognize the "avoir fiscal". Its existence created the incentive to foreign shareholders to transfer their shares to the domestic investors during the dividend period in order to profit indirectly from the tax credit. Additionally, two major tax reforms took place in France within the period of the research (2003-2008) – the abolition of "avoir fiscal" in 2005 and the introduction of Prélèvement Forfaitaire Libératoire (optional levy at source system) in 2008. So we can as well investigate the impact of the tax reform on the investor's behavior. As pointed out by Bolster et al. (1989) the tax code changes have a powerful effect on investor's trading pattern. In France, in 2003 and 2004, thus the years before the abolishment of "avoir fiscal", the trading volumes were on average 30% higher than normally for the 40 most traded securities on NYSE-EURONEXT, whilst in 2008 after the second reform, the market did not record any abnormal volumes.

The remainder of the research is organized as follows. In the Chapter 2 we shed a light on different dividend policy theories focusing mainly on theories taking into account the tax aspects. The next Chapter discusses the tax system in France. It provides a general overview of French tax legislation, mainly of income tax – personal and corporate. The deeper insight of capital gains and dividend taxation may be found in the Chapter 4. The detailed methodology is described in the Chapter 5. The results of transaction costs, arbitrage boundaries, ex-day price drops and abnormal volumes for the period 2003-2008 are reported in the Chapter 6.

2. Theoretical background

Businesses find dividends obvious', whereas 'economists find dividends mysterious

Easterbrook 1984

The dividend in the business dictionary is defined as *"share of the after-tax profit of a firm, distributed to its shareholders/stockholders according to the number and class of shares/stock held by them"*. From business point of view, the dividend is obvious. As concluded by the survey-based research the managers believe the investors have dividend preference (Brav et al., 2004). The same may be concluded from investor's point of view, thus the investors want dividend (Dong et al., 2005).

On the other hand the economists consider the dividend controversy to be *"one of the 10 unsolved problems in finance"* (Brealey and Myers, 2003).
Which amount should be distributed from company's cash? Should it be distributed in the form of dividend payment or rather by share repurchasing?

In fact the crucial question one may ask "*Why do corporations pay dividends",* if they have the possibility to distribute the cash via lower-taxed methods (ex. share repurchase) *„Why do investors pay attention to dividends? Perhaps the answers to these questions are obvious. Perhaps the answers are not so obvious. I claim that the answers are not obvious at all. The harder we look at the dividend picture, the more it seems like a puzzle, with pieces that just don't fit together"*(Black, 1976).

2.1. Dividend distribution

For decades, US companies have tremendously preferred to pay out cash in the form of dividends. In the US, during the period 1973-1996, the total amount of dividends distributed to shareholders was continually increasing and in 1996 reached the level of 297,7 billions of US dollars (Allen and Michaely, 2002). The same trend is present in France. The French companies are more and more generous with their shareholders. According to the INSEE study (2008) the proportion of dividends as percentage of gross

operating income has grown from 18% in period 1995-2001 to 25% in 2007. In general, the total dividend payout ratio does not decline. Within the years 1972-1998 it happened only twice, in 1992 and 1998 (Allen and Michaely, 2002). This phenomenon is called the dividend smoothing.

2.1.1. Dividend distribution from investors point of view

Different studies have been performed in order to answer the question, if the dividends are important for investors. Some of them analyzed the reaction of the market on the dividend announcement (Charest, 1978, Aharony and Swary, 1980, Eades et al., 1985) and found out the change of dividend policy is associated with abnormal returns around the dividend announcement date. Moreover they concluded the investors react positively if the dividend increases, but negatively if it drops down. Another researches directly questioned the investors about their dividend preferences and beliefs. The best known survey-based studies are those conducted by Dong (2005) on the sample of Dutch investors and by Maditinos et al. (2007) on the Greek sample. The key findings of these studies may be summarized up as follows (Baker and Kolb, 2009):

- The most strongly held belief is that the investors appreciate the dividend and want to receive it. However a sizable minority of shareholders does not want dividends or is indifferent to dividend payments.
- The dividend increase provides positive signal, whilst the decrease provides the opposite one. It confirms the conclusion of the previous studies of Charest (1987), Aharony and Swary (1980) and Eades et al. (1985).
- Dividend seems to be relevant , but the rational for dividend preference differs.

So the question, which arises, is: Why do the investors want the dividend?
Various theories were developed on this subject. Some of them explain the dividend preference by the existence of transaction costs. An investor, who has the option to choose between the stocks paying dividend and stocks non paying dividend, should choose the first option. The reason is the lower transaction cost of cashing in the dividends compared to regular selling of the part of his/her portfolio (Allen and Michaely, 2002).

Another explanation relies upon the uncertainty of future capital gains from questionable investment, the Bird-in-the-hand theory. According to this theory, the investors prefer the dividends today, because they are less risky.

The next explanation developed by behavioral finance; "behavioral life cycle" of dividends; is based on self-control. Shefrin and Statman (1984) argue the investors want to restrict their present consumption and postpone it for retirement, when they have no labor income and are more dependent on their securities holdings.

The agency cost theory underline the role of dividends as a useful tool for shareholders to control the overinvestment problem[1]. Easterbrook (1984) proclaims that dividends reduce the overinvestment problem because their payment heightens the frequency with which companies have to go to equity markets in order to raise supplementary capital. In the process of "equity acquisition", firms subject themselves to the monitoring of these markets.

One of the dominant explanations is the dividend signaling theory. This theory implies the managers have private information about the firm, so they know more about the company's true value than do its investors. The game-theoretic literature suggests various signals, which the managers can use to convey this information to the market (Lundstrum, 2005). The signaling theory formalized by Bhattacharya (1979), John and Williams (1985), and Miller and Rock (1985) implies that growth in dividend value is a credible signal that the firm's perspective has ameliorated (Ibid).

[1] According to the overinvestment theory of Jensen (1986), managers tend to expand the size of the firm, and therefore may take on negative NPV projects instead of paying dividends

2.1.2. Dividend distribution from companies point of view, The Lintner model

According to Wouters (2003) one may distinguish 2 different approaches to the dividend payout policy:

- **Dividend policy being residual decision of the company:**
  In abeyance with this theory the dividend policy is subordinated to the investment policy. Thus the firm invests in all investment projects having NPV greater than zero and only the remaining cash flow is distributed to the shareholders.

- **The real dividend policy:**
  The dividend policy is considered as very important for some companies. The firms behaving according to this theory endeavour after the stable and rather increasing dividend policy. Consequently some of the possible future investments have to be financed by debt issuance, instead of free cash flow.

However the empirical studies show that the most of the firms adopt the second approach. Albouy and Dumontier (1992) conducted a dividend study on the sample of 4200 French companies during the period 1982-1986 and found out the size and the profitability of the company have strong influence on the payout policy decisions. His research discovered that 9 of 10 companies with high profitability pay dividend.

Moreover as already mentioned, the firms in general increase the dividends and rarely cut them, the so called dividend smoothing. Lintner (1956) was the one who showed this phenomenon is widespread. In his study he created a list of 15 observable characteristics and factors, which might be expected to have an important impact on dividend policy. From 600 listed companies, he selected 28 for detailed investigation, such that there was a minimum of 3 firms within each major group of each of these characteristics.

The most important finding of his research is that *"dividends represent the primary and active decision variable in most situations"*. In general nearly all managers are convinced that the shareholders appreciate stable and increasing dividend policy. They strongly

believe the market puts a premium on firms with a stable or gradually growing dividend policy. Hence the management tries to avoid considerable changes in the payout policy. Only when the change is considered to be necessary, the managers are obliged to decide how large it should be. Nevertheless Lintner (1956) found no instance in which such a decision was considered without regard to the existing rate of dividend payment.

Secondly he showed the current net earnings were the most important factor determining the change in dividends. The management needed to explain to investors the reason for its actions and needed to establish its explanations on the simple and perceptible factor. Current net earnings meet this condition better than any other indicator.

Lintner's third finding was that dividend policy was determined by management on the first place. Other policies were subordinated and adjusted, taking dividend policy as given.

Lintner (1956) formalized the following model, which captured the most important elements of firms' dividend policies. For firm i,

$$D_t - D_{t-1} = a_i . + c_i \left(D_{it}^* - D_{i(t-1)} \right). + u_{it} \quad (1)$$

$$D_{it}^* = \alpha_i E_{it} \quad (2)$$

Where for firm i

D_{it}^* is desired dividend payment during period t

D_{it} is actual dividend payment during period t

α_i is target payout ratio

E_{it} are earnings of the firm during period t

$a_i .$ is a constant relating to dividend growth

c_i represents partial adjustment factor

u_{it} is error term

His model was able to explain 85% of the dividend changes in his sample of companies. Later on the model was tested by other researches who confirmed the Lintner model performed well. The most famous research is the one of Fama and Babiak (1968).

2.2. Modigliani-Miller Dividend Irrelevance Theorem

The best known and perhaps the most controversial theory of dividend policy was developed by Modigliani and Miller (1961). They demonstrated, in the perfect and complete capital markets, the dividend policy is irrelevant and the value of the company is independent of its payout policy, the Modigliani and Miller Dividend Irrelevance Theorem. In their framework the investors are indifferent between share repurchases and dividends, because the investors can replicate any desirable payout, either by selling holdings in the companies that don't pay dividends or by reinvesting their dividends.[2]

In contrast with the previous subchapter, from Modigliani and Miller point of view the dividend payout ratio is not considered as important for the companies and the amount of dividends distributed by the company has no impact on the wealth of the shareholders. Each payout policy is equivalent, because none of them may increase (or decrease) the value of the company. They pointed out that what really counts is the company's investment policy. As long as it does not change, altering the mix of payout and retained earnings will not affect the value of the firm.

The key assumptions of Modigliani and Miller's theory (1961) are:

- **Perfect markets**: in a perfect capital markets no buyer or seller is enough strong to influence the market price and the investors have perfect information. This world is free of transaction costs and of brokerage fees. Moreover no taxes and tax differentials between distributed and undistributed profits and between dividends and capital gains exist.
- **Rational behavior**: rational behavior means that each investor prefers more wealth to less and he is indifferent to form (cash payments or increase of holding of his shares) of the wealth he receives.
- **Perfect certainty**: the perfect certainty may be compared to an assurance on each future profit of corporation or all future investment. As a consequence, there is no need to distinguish between bonds and shares as a source of financing.

[2] Jenter, D. *Lecture of Finance Theory II (15.402)*, Sloan-School-of-Management, Spring 2003

Under these assumptions the "fundamental valuation principle" may be written as:

$$\frac{d_i(t) + p_i(t+1) - p_i(t)}{p_i(t)} = \rho(t) \tag{3}$$

$$\Rightarrow p_i(t) = \frac{d_i(t) + p_i(t+1)}{1+\rho(t)} \tag{4}$$

Where

$d_i(t)$ denotes dividend per share paid by firm i during the period t

$p_i(t)$ is the share price (ex any dividend in t-1) of firm i at the start of period t

$\rho(t)$ denotes rate of return independent of i

That means the price of each share has to be such that the required rate of return on every share will be the same across the whole market over each interval of time. In other way, the owners of low-return (high-priced) stock could increase their wealth by selling these shares and purchasing shares with higher rate of return. This process will bring down the price of low-return shares and push up the prices of high-return shares.

The effect of dividend policy may be seen more easily if the equation (4) is restated in terms of total value of the firm.

$$V(t) = \frac{D(t) + n(t)\,p(t+1)}{1+\rho(t)} \tag{5}$$

$$\Rightarrow V(t) = \frac{D(t) + V(t+1) - m(t+1)\,p(t+1)}{1+\rho(t)} \tag{6}$$

Where

$n(t)$ denotes the number of shares at the start of period t

$m(t+1)$ denotes the number of new shares issued during the period t at the ex-dividend closing price $p(t+1)$, so that $n(t+1) = n(t) + m(t+1)$

$V(t) = n(t)\,p(t)$ the total value of the firm

$D(t) = n(t)d(t)$ the total amount of dividend paid to the shareholders at the record date

The equation (5) illustrates very well how the current dividends may affect the current market value of the enterprise $V(t)$:

- The current dividend will clearly affect the $V(t)$ via he first term $D(t)$.
- The current market value may be influenced as well indirectly via the second term $V(t+1)$, the new ex-dividend market value. Anyhow Modigliani and Miller assume the future dividend policy is known and given for the period $(t+1)$ and is independent of current dividends $D(t)$.
- The third term $m(t+1)p(t+1)$ has an impact on the $V(t)$ too. The higher dividend payout in any period has to be compensated by the raise of capital from external sources in order to maintain any desired level of investment.

Therefore the market value of the company is affected by two contradictory factors. Taking into account the assumptions we did at the beginning *"the two dividend effects must always exactly cancel out so that the dividend policy to be followed in t will have no effect on the price at t"* (Modigliani and Miller, 1961).

Let's express $m(t+1)p(t+1)$ as function of $D(t)$:

$$m(t+1)p(t+1) = I(t) - \left[X(t) - D(t)\right] \qquad (7)$$

Where

$I(t)$ is the given level of company's investment during the period t

$X(t)$ is the firm's net profit for the given period

Substituting (7) in equation (6) we get

$$V(t) = \frac{X(t) - I(t) + V(t+1)}{1+\rho(t)} \qquad (8)$$

The term $D(t)$ does not appear anymore in the equation therefore we can conclude the dividend policy has no affect on the firm's current market value.

2.3. Firm's payout policy and taxation

Modigliani and Miller (1961) demonstrated the value of the company in the perfect and complete capital markets is independent of its payout policy. Nevertheless, in the real world the capital markets are imperfect, because of asymmetric information, transaction costs, incomplete contracting possibilities and taxes.

Moreover the empirical observations show positive correlation between the volume of dividend payments and stock price, thus the dividends do matter (Kai and Xinlei, 2008). Much of the literature has tried to clarify the pattern in firm's payout policies.

The taxation plays crucial role for the company's and investor's decisions. Heterogeneous taxes for the assets conduce to discrepancies between their immediate pre-tax market prices; therefore the taxation has an impact on asset pricing. The investor's dilemma can be expressed as: is the value of a EUR 1 of taxable dividend higher or lower than the value of a EUR 1 of capital gain? The investors confronting higher taxation on dividends relative to the taxation of capital gains may call for higher pre-tax returns on high dividend yield securities (Kalay, 1982). The firm's face the question how to distribute the profit among the shareholders.

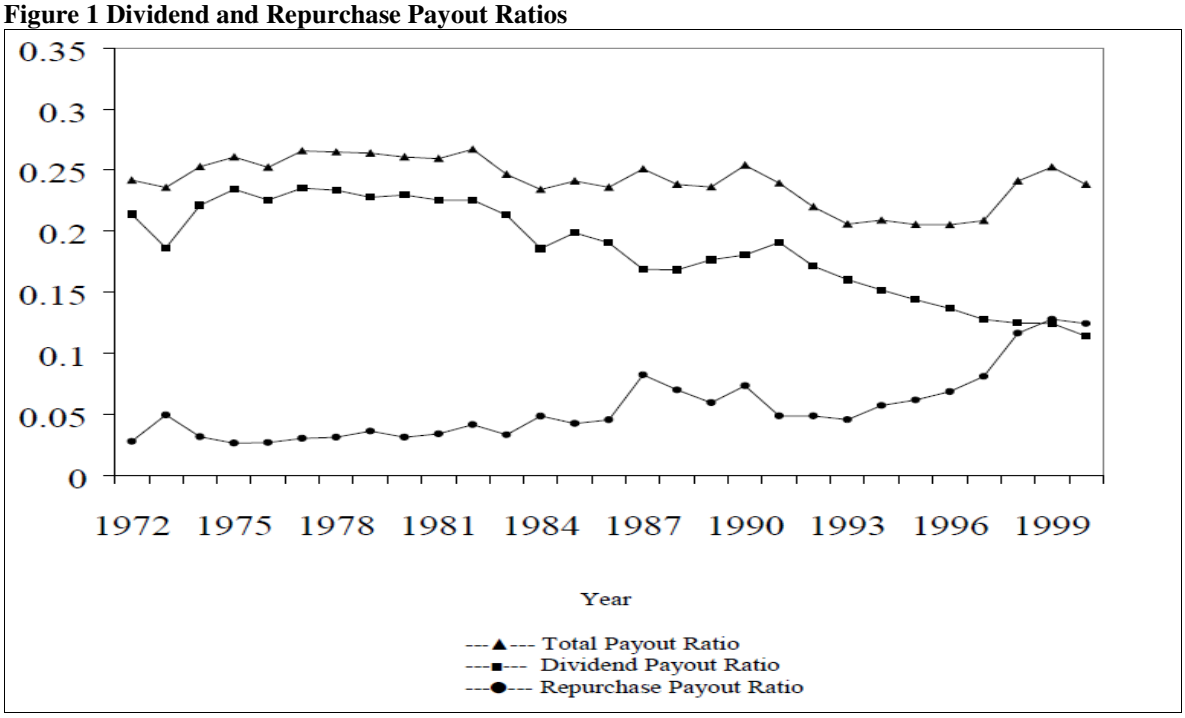
In the nearly perfect world, that is no transaction costs, no information asymmetry, but with diverse tax rates on capital gains and dividends, the companies should choose the payout policy, which is the most tax effective (Sander, 2007). From a tax perspective, there is an evident incentive for companies to replace dividends by share repurchases due to their more favorable tax treatment (Grullon and Michaely, 2002).

But as the empirical evidence shows, the companies still distribute huge amount in the form of dividend payments. Why do they do so? Much of the empirical literature has tried to solve the phenomena of *dividend puzzle*, but it seems to be still unexplained. Recently, the researchers documented, that the companies avoid making extreme changes in their payout policy as it may induce changes in the structure of ownership, and consequently negatively affect the share price (Brav et al., 2004). The detailed discussion about the dividend puzzle is out of scope of this diploma thesis. In more details, only the explanation

related to the fiscal effect will be discussed in the next subchapter. An excellent overview of dividend theories may be found in Kinkki (1997).

On the other side the empirical evidence suggests some kind of linkage between the taxes and the dividend policy (Lee et al., 2006). It seems the companies started to change the dividend payout as a consequence of changes in the relative dividend rate (see Bolster and Janjigian, 1991, Papaioannou and Savarese, 1994). In the works of Fama and French (2001) or Grullon and Michaely (2002) one can find a documentation of an increase in the share repurchases payout accompanied by decrease of firms paying dividends. Although the huge and already established companies had not reduced the dividend payments, the growth rate in dividend payout have been much lower than it used to be, and the amount of stock repurchases have grown significantly (Grullon and Michaely, 2002).

Figure 1 Dividend and Repurchase Payout Ratios



Source: Grullon and Michaely, 2002

2.3.1. The clientele effect

In general the dividends are taxed more heavily than capital gains, so rationally no dividends should be paid. But the firms still distribute the dividend on regular basis. The clientele effect theory tries to explain the logic behind such a behavior.

In reality not all investors are taxed the same way. The tax regime for individuals and corporate bodies differs. Moreover, some institutional investors are tax exempt. These shareholders have no reason to prefer capital gains to dividends. Additionally as pointed out by Allen and Michaely (2002) for capital gains, there is no obligation to realize them immediately, thus the associated tax may be postponed. The postponement possibility may create considerable value.

According to the tax-clientele theory the investors are divided into dividend tax clienteles and each clientele owns tax-specific portfolio. The model suggests that the shareholders in high (low) tax bracket should, ceteris paribus, concentrate their portfolios in tax-favored (highly taxed) assets (Seida, 2002). As consequence the firm's dividend policy, in some measure, determines the ownership structure. The investors are interested in different company policies, and if this policy changes, the investors will modify their holdings accordingly. This process causes the move of share price and the investors may incur costs of adjustment. Thus the enterprise should follow consistent dividend policy in order to attract suitable dividend clientele and minimize the adjustment costs for shareholders (Lumby and Jones, 1998).

Many authors were trying to validate the clientele effect theory in the reality. They attempted to find a significant inverse relation between the marginal tax rate and the dividend yield. Unfortunately the empirical studies do not support the theory.

Blume, Crockett, and Friend (1974) and Pettit (1977) were examining the individual's total stock portfolio and found the evidence of inverse relationship. However the heavier emphasis on high dividend yield shares by low tax bracket investors was only very mild.
Lewellen et al. (1978) re-examined the clientele effect issue using individual securities approach instead of the stock portfolios. However they did not confirm that the particular

shareholder group of a particular company shows any significant concentration by income tax circumstance. The clientele effect theory was not fully rejected by their research, *"Thus, even though high-income investors might, all other things equal, tend to prefer low dividend yield equities, those other things are not entirely equal"*, but due to the other factors influencing the investor's decision, they found no strong evidence of clientele effect: *"Risk appetites, transaction costs, diversification needs and perhaps perceived opportunities to exploit transitory valuation discrepancies can easily lead investors to select (and retain) stocks from the full spectrum of dividend-paying categories in arranging their ongoing portfolios. As a result, there may well be no substantial tax-rate specialization within securities yield classes after all, and that is what is required for a firm to think seriously about targeting its dividend and/or investment policies at a specific shareholder subset. We certainly find no indication of such intense specialization"* (Lewellen et al., 1978)

The Jain's study (2007) using data for the 1989–1996 period on the US market, found no support for the clientele effect. His results confirmed that the institutional investors have a preference for low dividend yield stocks compared to high dividend yield stocks, despite their favorable tax regime for dividend income. On the other side, the individual investors heavily taxed on dividends, prefer the high dividend yield stocks relative to low dividend yield stocks. In addition he found that individuals give priority to the dividend-paying firms whereas the legal entities prefer the non dividend paying enterprises.

On the other hand, Strickland (1997) proved that the tax-exempt institutions have a slight preference for comparatively higher dividend yield stocks relative to taxable institutions. Or, Graham and Kumar (2006) found mixed evidence in support of the dividend clientele effect theory.

The empirical studies are in general inconsistent with tax-based dividend clientele hypothesis or provide only a weak support for it. The main reason may be found in the others factors influencing the decision of different group of investors, such as risk, transaction cost, legal restriction and regulations etc.

2.3.2. The role of the risk

To date, the empirical studies of stock ownership do not show significant existence of clientele effect. It seems the high income investors have no special motivation to buy and own low dividend yield shares. But it is worthy to mention that the studies referenced in the previous chapter do not take into account all factors which may have impact on the investor's decision. This sub chapter aims to partially fill in this gap. We will consider the role of the risk, which will be incorporated in the analysis.

One of the first authors who tried to establish the relationship between the risk, profitability and fiscal effect was Brennan (1970).
Brennan created specific version of CAPM model (after-tax capital asset pricing model) and demonstrated for a given level of risk, the higher difference between tax rates on capital gains and dividends, results in higher dividend yield required by the investors.

Formally the model may be written:

$$E(R_{it} - R_{ft}) = c_1 + c_2\beta_{it} + c_3(d_{it} - R_{ft}) \qquad (9)$$

Where

R_{it} is profitability or return of the security i

R_{ft} is the risk free rate at date t

β_{it} is the systematic risk, or coefficient beta of the security i on date t

d_{it} is dividend yield of the security i on date t

In this model the positive coefficient c_3 signify the investors are demanding higher return on shares having higher dividend yield. This additional return should compensate the fiscal disadvantage related to the high dividend yield securities. Hence the significantly positive coefficient c_3 is interpreted as evidence of tax effect.

The Brennan's model was later on tested by several researchers. The best known are those of Black and Scholes (1974) and by Litzenberger and Ramaswamy (1979, 1980). However these two studies came to diametrically different results.

Black and Scholes (1974) conducted their research using the data from New York Stock Exchange during the period 1936-1966. The model they applied is a slight modification of Brennan's CAPM. Black and Sholes's (1974) equation may be written:

$$R_{it} = c_1 + (R_m - c_1)\beta_{it} + c_2 \frac{(d_{it} - d_{mt})}{d_{mt}} + \varepsilon_{it} \qquad (10)$$

Where

R_{it} is the return on portfolio i during period t

c_1 intercept term that should be equal to the risk-free rate, R_f, based on the CAPM

c_2 is the dividend impact coefficient and stands for tax effect evidence indicator

R_m is the return on the market portfolio

β_{it} is the estimated beta for stock i for period t or systematic risk of i th portfolio

d_{it} is the dividend yield on the portfolio i during period t, which is measured as the sum of dividends paid during the previous year divided by the end-of-year stock price

d_{mt} is the dividend yield of the market portfolio measured over the prior 12 months before t

ε_{it} is the error term

In order to test the tax effect hypotheses Black and Scholes (1974) created 25 stock portfolios divided in 5 groups based on the portfolio return. These portfolios were each year revisited. The null hypotheses they stated: the dividend-yield coefficient c_2 is not significantly different from zero. Indeed, they were not able to prove the significance of this estimator.

Finally they concluded: "*it is not possible to demonstrate that the expected returns on high yield common stocks differ from the expected return on low yield common stocks either before or after taxes*"."

The model of Brennan was also imperially tested by Litzenberger and Ramaswamy in their series of researches (1979, 1980, and 1982). The main criticism toward the Black and Scholes model relied on their adoption of stock portfolio referred to *"the loss of efficiency*

which arises from grouping stocks into portfolios" and long time series. In contrast with their model Litzenberger and Ramaswamy worked with individual shares and short term definition of dividend yield, that is they used monthly data instead of yearly ones.

The model of Litzenberger and Ramaswamy is formulated as follows:

$$R_{it} - R_{ft} = c_1 + c_2\beta_{it} + c_3\left(d_{it} - R_{ft}\right) + \varepsilon_{it} \qquad (11)$$

Where

R_{it} is the return on the share i during period t

R_{ft} is the risk free return

β_{it} is the systematic risk of security

d_{it} is the dividend yield of share i during period t

c_3 is the coefficient, which measures tax effect

ε_{it} is error term

Litzenberger and Ramaswamy found significantly positive coefficient c_3 in the period 1936-1977 – *„data indicate that there is a positive but non-linear association between common stock returns and dividend yields"* - and interpreted it as the existence of tax effect. They concluded the investors call for higher pre-tax returns on dividend paying shares in order to mitigate the effect of taxation. According to their results the shareholders require on 1% increase in dividend-yield an extra 23% growth (should be 0.23%) in expected returns.

Ross, Westerfield, and Jaffe (1999) very well described this state of knowledge:
"*financial theory indicates that the expected return on a security should be related to its dividend yield. Although this issue has been researched thoroughly, the empirical results are not generally consistent with each other. On the one hand, Brennan as well as Litzenberger and Ramaswamy find a positive association between expected pretax returns and dividend yield. On the other hand, Black and Scholes find no relationship between expected pretax returns and dividend yield. It is surprising that the results of such high quality research can be so contradictory. One can only hope that the ambiguities will be cleared in the future".*

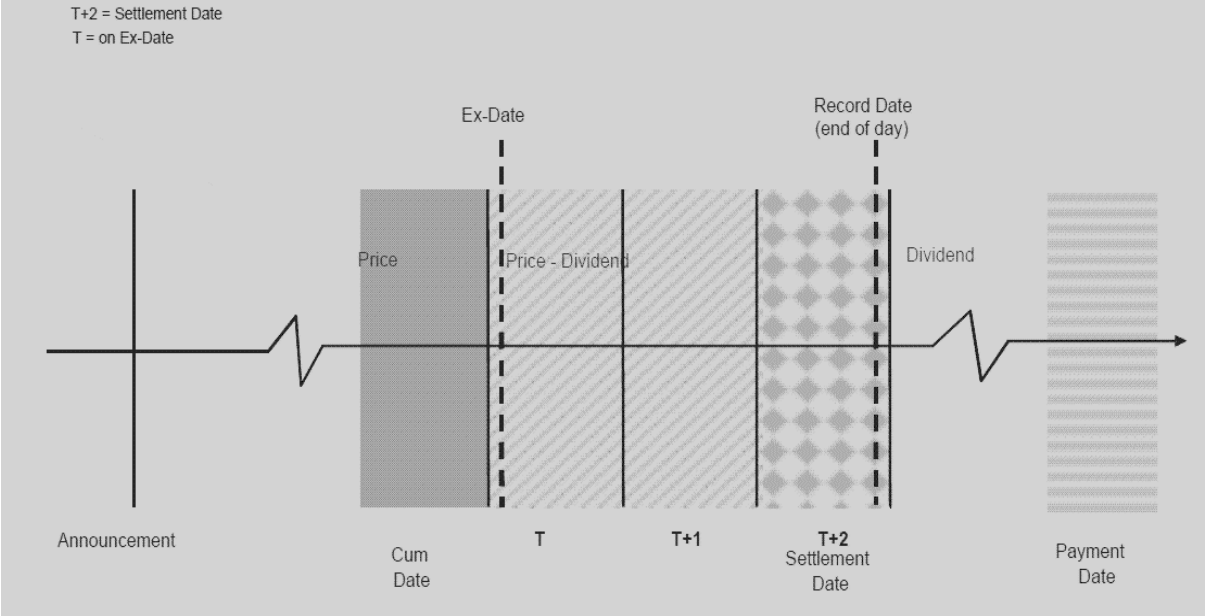
Later testing tried to reconcile these two experiments and showed they do not contradict each other. Kalay and Michaely (2000) found out the time horizon employed to define and measure the dividend period is of key importance for empirical results interpretation. If the dividend period is defined as short time horizon (Litzenberger and Ramaswamy's approach), from day to month the dividend yield coefficient (tax effect evidence indicator) is statistically significant. Nevertheless this coefficient captures the cross-sectional variations in returns (variation in returns across different shares with various dividend yields) and also the time-series variations in returns (variation in returns of specific stock between ex- and non-ex date periods). The presence of tax effect may be attributed only to cross-sectional variations. If we extend the dividend period (Black and Sholes's approach) we do not find any evidence of tax effect.

2.4. Tax induced trading around the ex-dividend day

In the context of this study the ex-dividend date denotes a date, when, as excellently explained in French *l'entreprise détache le dividende de ses titres* – the company *"detaches"* the dividend from its shares. The investor buying the stock ex-dividend is not entitled to the dividend payment. In order to receive the upcoming dividend he has to trade a day before ex-date, that is on cum-dividend day.

In the other words the investor has to own the shares on record date. According the market practice followed on NYSE Euronext in Paris the standard settlement life cycle is T+3, it means the record date has been fixed at 2 business days after the ex-date. Therefore the investor has to trade latest on the cum-dividend date, in order to have the transaction been settled until the record date and in order to be entitled to the upcoming dividend payment.

Figure 2 Settlement life cycle on NYSE Euronext



Source: www.euronext.com

The tax influences the company's payout policy, thus the volume of the dividends. And it affects the investor's decisions. Different tax rate on dividend income and capital valorization allows the economic agents to execute mutual gains at the government expense, by trading among them around the first ex-dividend day. Scholes and Wolfson (1992) argues that the unlike tax treatment provides intensive stimulus for taxpayers to employ different tax planning strategies. Chaplinsky and Seyhun (1990) using US data demonstrated the appreciable impact of taxation on the selection of investment income.

According to Allen and Michaely (2002) a significant turning-point in the literature on dividends and taxes, was the realization that the economic agents could conduct dynamic trading in order to decrease their tax liability. Different tax avoidance strategies have been proposed in the works of Miller and Scholes (1978) or later on by Stiglitz (1983). Both papers argument, that rational investors using dynamic trading strategies, could avoid all taxes in perfect capital markets. Such a conclusion brings us back to the Modigliani and Miller Dividend Irrelevance Theorem. However as mentioned by Stiglitz (1983) the proposition, that all taxes are avoidable in perfect capital markets, can be tested in reality very easily. If the above proposition is true, the government should not collect any tax revenue. In fact the government collects each year substantial amounts of revenue arising from taxation, hence the invalidity of the theory could be explained by:

- Irrationality of investors

- Capital markets imperfection
- Omission of important details in modeling the tax avoidance strategies

Stiglitz concludes the imperfect capital markets are the main reason. Peterson et al. (1985) document the tax avoidance strategies as described in the work of Miller and Scholes are not widely used due to extremely high transaction costs. The similar conclusion may be found in Allen and Michaely (2002): *in practice, the transaction costs of pursuing these strategies appear to be too high to make them empirically significant.* The dynamic tax avoidance strategies seem to be empirically relevant around the ex-dividend day.

If an investor values capital gains more than dividends he should sell the share cum-dividend. Contrary the investor with dividend preference should be on the buy side. The next day (the ex-dividend day) the reverse transactions should take place. This is the main idea of *dynamic dividend clientele effects* as presented in the works of Michaely and Vila (1995), Liljeblom et al. (2001), McDonald (2001) or Sander (2007).

A large number of ex-dividend studies have been conducted. Most of them deal with the ex-dividend price anomaly. Modigliani and Miller (1961) predict the share price on ex-dividend day should drop exactly by the amount of dividend. However the empirical studies show the price drop is not equal to the dividend amount.

One of the possible explanations is the *tax effect hypothesis* or *tax-clientele hypothesis*, thus different tax treatment of dividends and capital gains. In this framework, the taxation influences trading decision and prices. According to Allen and Michaely (2002), the tax hypotheses can be divided into static models (investors trade only once) as presented by Elton and Gruber (1970) and Litzenberger and Ramaswamy (1979) and into dynamic models (investors are allowed to trade multiple times) as described above.

The Second explanation argues the one-for-one price drop-to-dividend doesn't occur due to the presence of short term traders on the market - *the short-term trading hypothesis* (ex. see Kalay 1982, Dasilas, 2007).

Recently a new theory, based on the microstructure impediments, has been arisen (see Frank and Jagannathan, 1998, Bali and Hite, 1998).

Different studies have been devoted to the trading volume behavior around the ex-dividend day. A large number of researches have found an abnormal trading volume occurring around the ex-day. Most of them explain this phenomenon by the use of tax arbitrage strategies. Lakonishok and Vernalaen (1986) reported 36% higher trading volume around the ex-day comparing to the average trading. Michaely and Murgia (1995) using the data from Milan Stock Exchange, showed the volume is 25% higher than normally on the cum-dividend day. Dhaliwal and Li (2006) concluded the tax-induced trading is the main reason of excessive trading volume around ex-dividend days. In Sander (2007) one can find the sole evidence from CEE proving the tax-induced trading takes place also on the "younger" capital markets. In 36 cash dividend distributions out of 50 the abnormal volume is at least two times higher than the average daily volume on the Estonian stock market.

2.4.1. The Elton Gruber model

Different authors argued the marginal tax rate of specific stockholder may be inferred by comparison of ex-dividend price drop to the dividend per share – the ex-dividend date relative price drop. (Campbell and Beranek, 1955, Readett, 1956). The most extensive of these researches was the study of Elton and Gruber (1970).

They tried to find the relation between the dividend yield and marginal tax rates using the ex-dividend price data.
According to Elton and Gruber (1970) the ex-dividend behavior of firm's shares „*should be related to the tax rates of its marginal stockholders"*. In their model each investor has two possibilities: either to sell the security before the ex-dividend date, that is cum-dividend or on/after the ex-day. All under the assumption, that the investors are maximizing their after tax wealth and the dividends and capital gains are taxable at different rates.

The empirical researches show, the price of the share on the ex-day drops. In a perfect capital market the decrease in price should mirror the dividend value regarding to the capital gains to the marginal shareholder. If an investor sells the securities before they go ex-date, he loses the possibility to receive the dividend, but he is compensated with higher price. On the other side if he sells the securities on or after ex-date, he is entitled to get the

dividend, but should expect to sell it at lower price. Thus the investor maximizing his wealth, has to decide if the stock should be sold cum-day or ex-day, taking into account the tax rate imposed on dividend income and capital gains. In their model one may derive the tax rates of marginal shareholders from ex-day behavior of common stocks.

More formally

$$P_B - t_c(P_B - P_C) = P_A - t_c(P_A - P_C) + D(1 - t_d) \quad (12)$$

Where

P_B is the price stock on cum-dividend day

P_A is the price stock in ex-dividend date

P_C is the price at which the stock was purchased

t_d is the tax rate on dividends/ordinary income

t_c is the tax rate on capital gains

D is the amount of dividend

Rearranging we get

$$\frac{P_B - P_A}{D} = \frac{1 - t_d}{1 - t_c} \quad (13)$$

The right hand side of the equation (12) represents the after tax return of ex-date selling strategy and the left-hand side represents the after tax return of cum-date selling strategy, in both cases assuming the stock was bought at P_C. In the equilibrium the investor is indifferent between the two strategies. If the anticipated ex-date price is too high (too low), the marginal sellers and/or buyers would change the timing of their sale or purchase until the stock price falls to equilibrium. Therefore the statistic $\frac{P_B - P_A}{D}$ has to reflect the tax brackets of marginal shareholder.

Elton and Gruber (1970) showed not only the marginal investor tax bracket may be inferred from ex-date stock behavior, but also that these brackets are related to company's payout policy. They provided strong support for clientele effect theory, that is the

shareholders in high tax brackets have a preference for capital gains, whilst the low tax bracket investors prefer dividends.

2.4.2. The Kalay model

The impact of dividend policy on investor's decision is the issue of growing interest in the financial literature. Kalay (1982), contrary to Elton and Gruber (1970) argued the ex-dividend price drop cannot determine the tax bracket of marginal stockholders. By relaxing some assumptions from Elton Gruber model he showed, the short term trades may eliminate a tax effect in prices. The main difference between the two models is the frequency of trading. Whilst in the Elton Gruber model (1970) the investors may trade only once –presence of long term investors, in the Kalay's model (1982) they are allowed to take different positions trough time – presence of short term traders on the market.
Moreover Kalay (1982) makes no difference between the tax rate on dividend and capital gain income, the reason is simple: in US the short term capital gains, that is less than 12 months are taxed as ordinary income.

His reasoning is the following:
If the arbitrageurs expect large difference between dividend per share and the ex-dividend price drop, they are motivated to enter in short term transactions around the ex-dividend date in order to profit from this gainful opportunity.

If the dividend per share is inferior to the expected price drop on ex-date by more than transaction costs of the "round trip" (cost of buying and selling the stock), investors may realize profit by selling the stocks cum-dividend and buy them back the day after. More formally:

$$(1-t_o)\left[P_B - \overline{P}_A - D - \alpha\overline{P}\right] > 0 \qquad (14)$$

Where

t_o is the marginal tax rate on ordinary income

P_B is the share price cum dividend

$\overline{P}_A$ is the expected share price ex-dividend

D is the dividend per share

$\overline{P} = \frac{P_B + \overline{P}_A}{2}$

$\alpha\overline{P}$ is the expected transaction cost of "a round trip"

Inversely, if the dividend per share is higher than the expected price drop by more than the transaction costs related to the trade, the investor will be better of buying the shares cum dividend and selling them on ex-dividend date.

$$(1-t_o)\left[D-\left(P_B-\overline{P}_A\right)-\alpha\overline{P}\right]>0 \qquad (15)$$

In both cases, if the dividend per share differs from the expected price drop, the short term arbitrageurs may realize a profit regardless the tax rate imposed on the ordinary income. It is more than evident, that the total profit depends on tax factors, however whichever amount of profit is better than zero.

By combining equations (11) and (12) we get:

$$\left|D-\left(P_B-\overline{P}_A\right)\right| \le \alpha\overline{P} \qquad (16)$$

$$\Rightarrow 1-\frac{\alpha\overline{P}}{D} \le \frac{\left(P_B-\overline{P}_A\right)}{D} \le 1+\frac{\alpha\overline{P}}{D} \qquad (17)$$

As we see the tax rate on ordinary income t_o does not figure anymore in the equation. Therefore one cannot infer the tax bracket of marginal stockholders from the price behavior on the ex-dividend day. The presence of short term arbitrageurs will ensure the equilibrium on the market and the allowable interval for $\frac{P_B-\overline{P}_A}{D}$ in the absence of profit opportunity is dependent on the transaction costs and inversely proportional to the dividend yield. This is the point of view of Kalay (1982).

Taxes affect behavior but not prices, i.e., through their trading the arbitrageurs will ensure that the price drop equals the dividend amount. Since Kalay (1982) uses the arbitrage framework, he can show that short term investors may take an unlimited position in the stock as long as the expected price drop is not equal to the dividend amount.

3. Tax system in France

Taxation, in reality, is life. If you know the position a person takes on taxes, you can tell their whole philosophy. The tax code, once you get to know it, embodies all the essence of life: greed, politics, power, goodness, charity.

Sheldon S. Cohen

According to Bernardi et al. (2004), within the Europe one may distinguish four models of tax system:

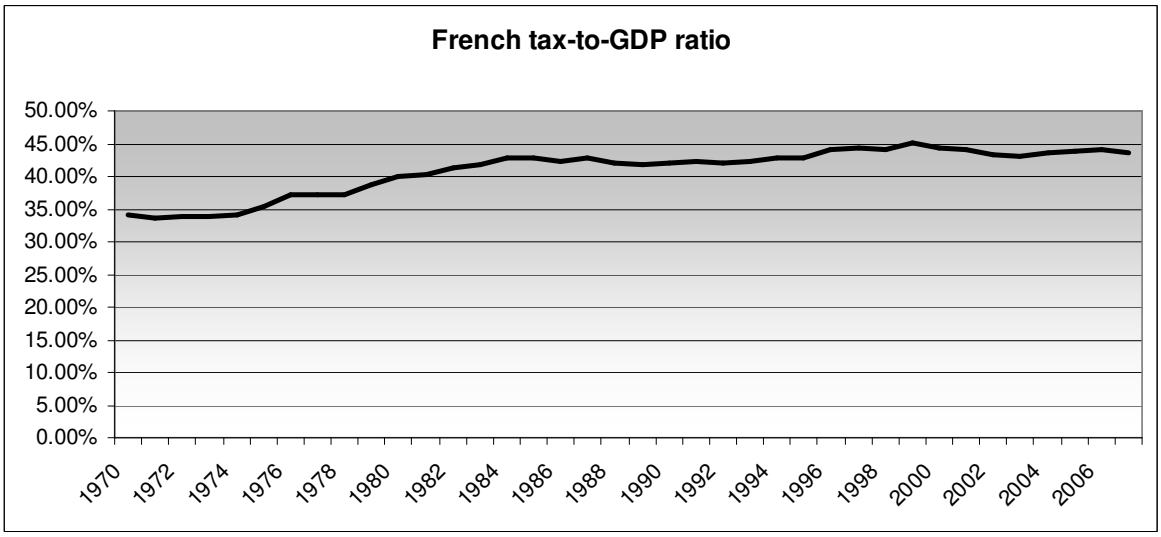
- DIT model or the Dual Income Taxation, which is the system implemented in Nordic countries in the early 1990s
- British model
- Rhine model (France, Germany…)
- Mediterranean model

Even though the European Members states strive for tax harmonization, in order to remove distortions and obstacles to trade within the Single Market, they have not achieved this objective yet. The tax harmonization on the European level has lagged well behind the economic integration and liberalization of capital flows. As presented by Hoek (2003) the tax burdens within the European Union heavily increased over the past 35 years, but they didn't converge.

France belongs to the countries with relatively high tax level in comparison with the other European countries. The overall tax burden is characterized by various mix of direct and indirect taxes and different contributions to finance ensuring high public welfare (Scabrosetti, 2002).

The ratio of total tax revenue as a percent of GDP, so called tax– to– GDP ratio, is in general used as the indicator of the overall tax burden. In France during the 1970s, the tax– to– GDP ratio has increased rapidly and remained fairly stable at a level of 44% over the last 30 years (Figure 3).

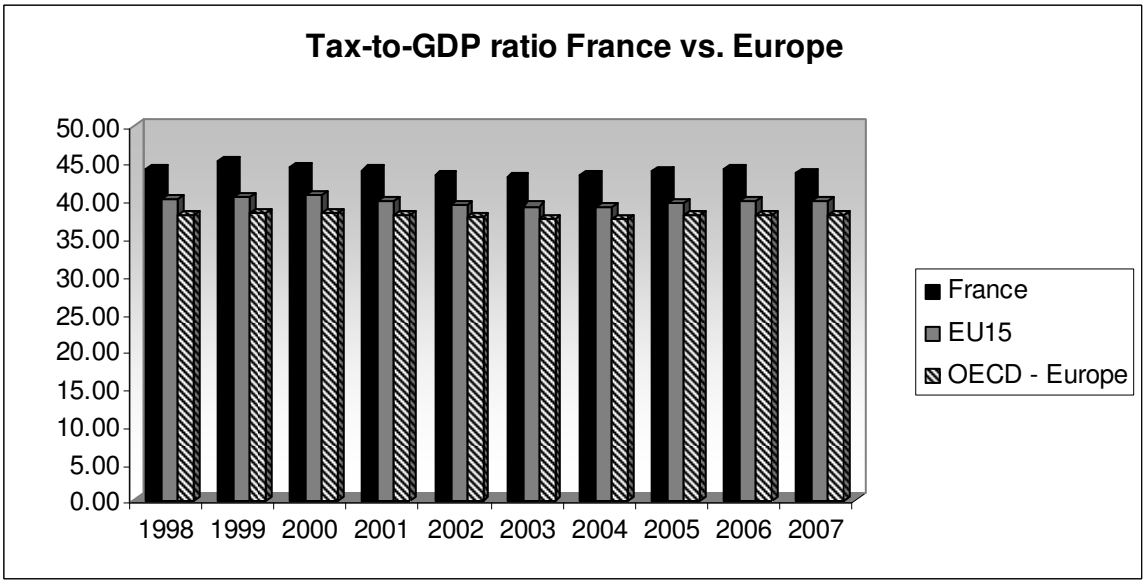
Figure 3 French tax-to-GDP ratio



Source: OECD

The French tax– to– GDP ratio is comparable to the one of Austria, Belgium, Finland, Italy and Norway, but it substantially higher than the EU average (Figure 4). Only in Denmark and Sweden the level of tax– to– GDP ratio is significantly higher than France.

Figure 4 Tax-to-GDP ratio: comparison of France and Europe



Source: OECD

Moreover, the French tax system may be characterized by its complexity. Specific taxes are levied upon a different activities and items, and the system involves many institutions in computing, collecting and allocating revenues. The complexity is underlined by a great

variety of more or less important allowances and exemptions for some agents, activities or sectors (Leibfritz and O'Brien, 2005).

This chapter aims to shed light on the French tax system focusing mainly on the taxation of dividends and capital gains, needed for further empirical analysis.

3.1. Legal framework and fiscal residency

3.1.1. Code Général des impôts

The actual French tax system was engendered during the last century. All "old" taxes created after the French revolution, were abolished and in 1950 various tax statuses were codified in a single code; the French Tax Code or Code Général des Impôts (C.G.I). The C.G.I represents the regulatory framework and the main source of tax law in France.

The C.G.I is composed of 2 books

1. Assiette et liquidation de l´impôt (Tax base and precept)
2. Recouvrement de l´impôt (Revenue collection)

both including laws covering Income Tax (Art. 1 A– 248 of C.G.I), Value added Tax (Art. 256– 298 of C.G.I) and other turnover taxes such as TV services, aviation etc. (Art. 302 bis KA– ZF), Indirect taxes (Art. 302 A–633 of C.G.I) and the taxes related to registration fees – *droits d´enregistrement,* stamp duty – *droit de timbre* and solidarity tax on wealth – *impôt de solidarité sur la fortune* (Art. 634 – 1137of C.G.I)

Another fundamental text related to the fiscal matters is the „Livre des procédures fiscales"– Fiscal Procedures Book, which creates the regulation framework for controls and checks the activity of the Fiscal administration.

3.1.2. Residents vs. Non– residents

The fiscal residency (domicile fiscale) is the main criterion deciding whether the natural or juridical person is liable to tax in France on the worldwide income or not.
Any individual or legal entity being resident in France for tax purposes is subject to the French income tax on the worldwide income (within and outside of France). Under the French law, the fiscal residency is specified as follows (Art. 4B of the C.G.I):

- An individual becomes the resident in France for tax purposes if he/she meets one of the below conditions:
    - France is his/her principal place of abode; in order to determinate the fiscal residency a general rule is applied – if he/she spends in France at least 183 days during a calendar year .
    - France is the place where he/she performs his/her professional activity.
    - France is the center of his/her financial and economic interests.

- A legal entity having its principal place of business or registered office in France, is characterized as fiscal resident in France for tax purposes

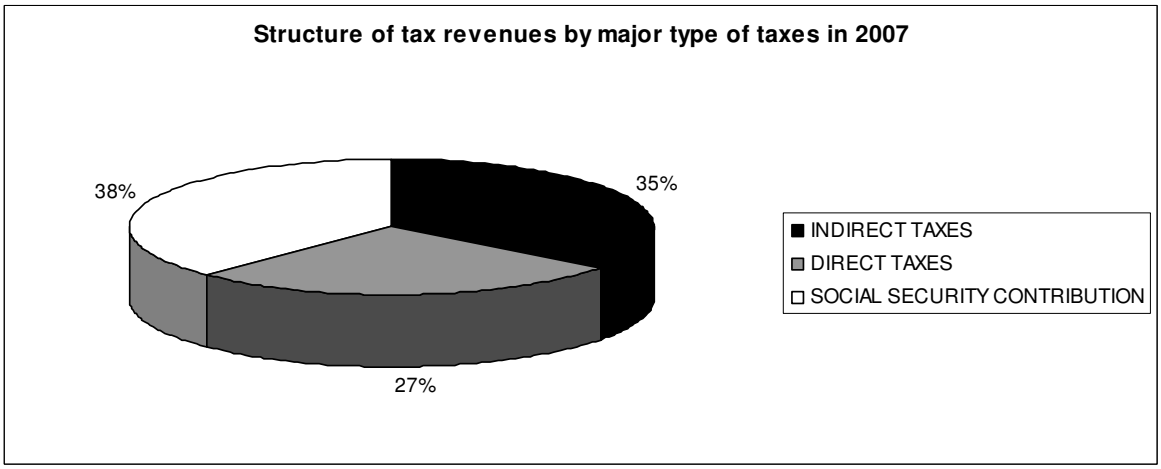
Contrary, the individuals or legal persons having the status non– resident, are taxed only on their French source income. In some cases they may be required to appoint a representative in France, who is authorized to receive all tax related correspondence vis– à– vis the French tax authorities. The liability to taxation is governed by the Double Taxation Treaty (DTT), which aims to avoid the double taxation of the same income. France has at the moment over 110 DTTs in force.

3.2. Tax structure

3.2.1. The structure of tax revenues by major type of taxes

France in general belongs to the countries with high social securities contributions (SSC). According to data from Eurostat (2007), the SSC in France represented the second highest share relative to GDP in the EU, and the biggest proportion of total tax revenue (37.6%). The SSC have an important impact on the employers, due to the fact that France in 2007, ranked uppermost in terms of SSC paid by employer in % of GDP. The indirect taxes made up over 35.4% of total tax revenue, consisting mainly from value added tax – VAT (16.6%) and other taxes on production (9.8%). Surprisingly, the direct taxes generate the lowest contribution to the government budget, in contrast with the fact, that the marginal tax rate is one of the highest among EU countries. The reasons are the huge tax allowances prevailing for families with children. This tax preference largely diminishes the tax liability for married couples and for families with 3 children, and leads to the erosion of income tax base (Leibfritz and O'Brien, 2005). As a consequence, only 50% of population is paying the income tax (Ibid).

Figure 5 Structure of tax revenues as a percentage of total tax burden



Source: EUROSTAT

3.2.2. List of taxes

In France one may distinguish 4 main types of tax[3]:

1. **Les impôts sur la dépense (Taxes on spending)**

The „impôts sur la dépense“ impacts consumption and investment of household and corporate sector. Traditionally the taxes on spendings consisted of indirect duties on the consumption, circulation and excise duties (applied mainly on tobacco, alcoholic and energy products). The introduction of VAT (Value Added Tax) and its generalization have substantially diminished the scope and total revenue of this tax. Even though, the tax on petroleum (la taxe intérieure sur les produits pétroliers) products, still generates high tax income.

2. **Les impôts sur le patrimoine (Wealth tax)**

The wealth (le patrimoine) may be taxed when transferred for free (inheritance, gift) or when sold. In these cases, the taxation most often takes the form of registration fees. Moreover, it may be subject to imposition when owned: wealth is subject to the yearly taxation through the so called ISF – "Impôt de Solidarité sur la Fortune" (solidarity tax on fortune) and the property taxes. The real estate properties and the capital gains from the wealth are taxable, but the corresponding tax is the local tax (for real estate) and the tax on income (for capital gains), not on wealth.

3. **Les impôts directs locaux (Local direct taxes)**

The local direct taxes are the oldest taxes of the French fiscal system. In fact, they succeed to direct contributions which have been created in 1790 – 1791 and collected by the central government. At the occasion of the tax reform of 1914 – 1917 they have been taken over by local authorities. The tax bases are based on the cadastral rental value, which is a theoretical yield of property estimated by French administration. There are four main direct taxes (la taxe foncière sur les propriétés bâties, la taxe foncière sur les propriétés non

[3] La fiscalité françaises 2008
http://www.impots.gouv.fr/portal/deploiement/p1/fichedescriptive_3391/fichedescriptive_3391.pdf

bâties, la taxe d'habitation and la taxe professionnelle). The rates are set by the municipal or regional assemblies when they decide their annual budget. Nevertheless, the rates are not allowed to exceed certain limits established by the state. The tax bases are set by the state.

4. Les impôts sur les revenus (Income tax)

In France the income tax may be divided in 4 categories:

4.1. **L'impôt sur les sociétés IS** (Corporate income tax).

4.2. **L'impôt sur le revenu, auquel sont assujetties les personnes physiques IR** (Personal income tax).

4.3. **Les impôts à finalité sociale ou prélèvements sociaux PS** (Taxes for social purposes).

4.4. **Les taxes dues par les employeurs sur le montant global des salaires** (Taxes paid by employers on the total amount of wage).

The dividend taxation and the taxation of capital gains fall within the income tax category. Therefore, the income tax will be discussed in more details in the next subchapter.

3.3. Income tax

3.3.1. L'impôt sur le revenu IR – Personal income tax

For each fiscal resident the IR in France is levied annually on his/her worldwide income.
The Art. 12 of C.G.I defines the taxable revenue as each benefit or profit realized by taxpayer or any income he owns during the fiscal year. The fiscal law specifies 8 different income categories subject to taxation:

1. **Revenus fonciers** – Income from property (Art. 14 of C.G.I): income from rental of any kind of properties such as houses, plants, boats or land.
2. **Bénéfices industriels et commerciaux** – Business income (Art. 34-35 of C.G.I): defined as business profit emanating from any commercial, industrial or handicraft activity

3. **Rémunérations allouées aux gérants et associés de certaines sociétés** – Remuneration paid to managers controlling family companies or limited partnerships (Art. 62 of C.G.I).
4. **Bénéfices de l'exploitation agricole** – Agricultural income (Art. 63 of C.G.I): includes the income from usage or rural property, forest production etc.
5. **Traitements, salaires, pensions et rentes viagères** – Salaries, wages, pensions and annuities or Employment income (Art. 79 – 81 quater of C.G.I).
6. **Bénéfices des professions non commerciales** – Income from non commercial activities (Art. 92 of C.G.I): income from liberal professions such as writes, composers, legal and medical professions and other income not classified into any other category.
7. **Revenus des capitaux mobiliers** – Income from movable property – This category defines the income from movable property such as dividend, capital gains or interest originating from French sources and as well the income issued outside France. It is worthy to mention, that the dividend in the fiscal meaning is any distributed income by the moral person (ex. profit from liquidation of assets).

The taxable income is firstly computed within each category applying its own rules. The total taxable income is sum of the results for each income category diminished by personal deductions and allowances. The final income tax may be reduced by tax credits (Kesti, 2008).

The tax is in general imposed on the aggregate amount according to a progressive scale. Only certain types of revenue are taxed separately at flat rate (Ibid). For the fiscal year 2008 the Art. 197 of C.G.I defines the progressive tax rates as per Table 1.

Table 1 Marginal tax rate in 2008

Personal Income Tax 2008	
Income classes	**Tax Rate %**
Up to 5,852 EUR	0
5,852 EUR to 11,673 EUR	5.5
11,673 EUR to 25,926 EUR	14
25,926 EUR to 69,505 EUR	30
over 69,505 EUR	40

Source: Art 197 of C.G.I (2008)

In addition, the fiscal system considers the specific situation of each household. The *quotient familial*[4] (family quotient) has been established (Law 31 December 1945) in order to reduce the tax burden of families (Scabrosetti, 2002). The tax liability for household is then calculated on the aggregate level, taking into account the total number of household members, including children, it means each child adds to the tax quotient of the family (Beblo et al., 2003). The family members are awarded by number of points according to scale defined in the Art. 194 of C.G.I..

Table 2 Family quotient

Marital status	Number of children	Coefficient
unmarried, divorced, widowed	0	1
married	0	2
unmarried, divorced	1	1.5
married, widowed	1	2.5
unmarried, divorced	2	2
married, widowed	2	3
unmarried, divorced	3	3
married, widowed	3	4
Etc.		

Source: Art 194 of C.G.I (2008)

The fiscal liability for household is then the sum of the aggregate incomes of each family member, divided by the family quotient according to the Table 2. The progressive tax rate applies to the resulting revenue (Art. 193 of C.G.I.).

3.3.2. L'impôt sur les sociétés IS – Corporate income tax

The corporate bodies in France are subject to IS during the fiscal year, which generally starts 1st January and ends 31st December. Contrary, to the rules applied in the most EU and OECD countries ,the French corporate tax is based on territoriality principle (Direction of tax legislation 2008), that is only the income arising from France is liable to tax (Art. 209 of C.G.I.).

[4] The *quotient familial* is the form of income splitting.

The moral persons falling into the corporate income tax category are defined in the Art. 206 of C.G.I. According to this article, the IS is levied on sociétés anonymes (joint-stock companies), les sociétés en commandite par actions (limited partnerships with shares), les sociétés à responsabilité limitée (limited liability companies), les sociétés coopératives et leurs unions (co-operative and their unions), public institutions, state organizations with financial autonomy, and any other juridical person doing "lucrative" business. The organizations which do not exercise a lucrative activity are subject to IS too, but only at reduced rate of 24% or 10% for the revenue specified in the Art. 219 bis of C.G.I.

The tax base or the benefits, which may be taxed as corporate income, belong to the category of business income and are determined by the Art. 34-45 and 53-57 of C.G.I. In general, the taxable income is defined as the total income from normal business activities in France. According to the Art. 38 of C.G.I. the net business profit is given as the difference between the value of net assets at the close of the financial year, and their value at the opening of the financial year, increased by payments to shareholders and decreased by additional injections of capital (Monaco, 1999).

The standard corporate tax rate is prescribed by the Art. 219 of C.G.I. and equals to 33⅓ %. However, we have to take into the size of the company, when determining the tax rate. From 1.1.2002 the SME (Micro, small and medium-sized enterprises) may be subject to the reduced rate of 15% and this rate is applicable only for the first EUR 38,120 of the profit (Art 219 of C.G.I.). The SME according to the French tax law is the company owned by 75% by individuals, or by another society satisfying the same owner structure. The turnover threshold is set to EUR 7,630,000 (Ibid).

Table 3 Corporate tax rate

SHARE CAPITAL	
has been fully repaid and 75% of shares is owned by individuals	has not been fully repaid or less than 75% is owned by individuals
TAX RATE	
15% for the first EUR 38,120 33.⅓% for the profit higher than EUR 38,120	33.⅓%

Source: Site de l´administration fiscale (http://www.impots.gouv.fr)

Furthermore, the large companies, with turnover higher than EUR 7,630,000 are subject to a supplementary surcharge; the contribution sociale sur les bénéfices – CSB (social contribution on benefits), hence the effective tax rate is equal to 34.43%.

3.3.3. Les impôts à finalité sociale or prélèvements sociaux PS – Taxes for social purposes

The French Social Security System, based on solidarity principle, and founded in 1945, "*…guarantees that everyone shall have the means required to support themselves and their family in decent conditions, under all circumstances.*[5]" The main source of social security system financing in France, are contributions and taxes deducted from earnings (European Commission 2009). The social security contributions paid by the employers are notably high, and range between 35 % and 45 %. The employees contribute to the social system by 14% of their income (Ibid).

A set of two "taxes" applies to all salaries, pensions, investments, rental and capital gains: the Contribution Sociale Généralisée – CSG (general social welfare contribution) and Contribution au Remboursement de la Dette Sociale CRDS (welfare debt repayment levy). The CSG was introduced in 1991 in order to replace partially the employee's contribution for pension, and nearly all his contribution for health insurance (Gilbert and Parent, 2004). The CRDS taxation was introduced 5 years after the CSG to reduce the debt of social security system. The rate of above mentioned taxes differs depending on the type of income.

Moreover, the French residents are subject to prélèvement social PS (social tax) of 2% plus additional contribution of 0.3% on their investment, rental income property and capital gains. This amount is levied on the net amount as computed for personal income tax purposes (Ibid). The PS has increased from 2.3% to 3.4% in 2009, and is not deductible for the income tax purposes (the sole deductible tax is CSG)[6]

[5] Explanatory statement from the French decree of 4 October 1945 establishing the Social Security
[6] Site de l´administration fiscale (http://www.impots.gouv.fr)

Table 4 Social Charges – Rates

	Wages/Salaries	Pensions/Benefits	Investments/Rental/Capital Gains
CSG	7.50%	6.60%	8.20%
CRDS	0.50%	0.50%	0.50%
PS	0%	0%	3.40%
Total	**8%**	**7.10%**	**12.10%**

Source: Site de l´administration fiscale (http://www.impots.gouv.fr)

4. Dividend and capital gains taxation

When a person earns income, they pay tax on wages and salaries. If they consume the remainder of income right away, they will not pay further tax, at least not under the income tax. However, if they put their money into a bank account or into an equity share, and they earn income, either capital gains, interest income or dividends, they will pay tax on that income. They are paying additional tax on their savings. Therefore, savers are discriminated against under an income tax compared to consumers.

Jack Mintz

4.1. Corporate tax systems

The investment in the corporate sector, mainly the equity investment, may be discouraged by relatively high tax rates emanating from double taxation of the same income. The aim of this subchapter is to describe how the "two-tier" tax imposed on dividends may be eliminated or mitigated.

The usual problem of dividends distributed by the company is their double taxation, once on the corporate level and secondly on the personal level. This double taxation may have a distortional impact on financial and investment decision making. Therefore the most of the EU countries implemented a combined corporate and personal income treatment, the so called "corporate tax system" (Blazic, 2005)

In the literature one may find different approaches of how to divide the combined tax systems, depending on the degree of mitigation of dual level tax. We will introduce the classification proposed by Cnossen (1993), which defines various corporate tax systems according to the degree of integration of corporate income tax into the personal income tax. The classical system or "no integration system", and the conduit system of full integration represent the two extreme positions.

The **classical system** considers each company and its owners as a separate tax entities (Kari and Ylä-Liedenpohja, 2002). Hence, the classical system imposes the income twice, firstly on the corporate level and then on the shareholders level; their dividends and capital gains.

Such a system damages the incorporation of business ideas, restricts the equity financing, redistributes the capital from corporate to the unincorporated sector, and consequently leads to efficiency loss of the whole economy (Jugurnath et al., 2004). Gravelle (1991) proved, that the misallocation of resources may have negative macroeconomic implications, encompassing lower GNP growth. Proponents of the classical system argue, that the ownership (shareholders) and the control (management) are disconnected, thus the shareholders have no influence on profits, only get the dividends when they are announced by management (Blazic, 2005). One of the few countries still using the "no integration system" are United States (Jugurnath et al., 2004) or Netherlands (Muller, 2007), the system is implemented in none of the new member states (Siroky, 2006).

The **conduit system** contrary ensures, the tax is levied on income only once, either on the corporate level or on the personal level.

Dale (1990) defines two polar models for the conduit system:

1. **Partnership model**: under which the whole income, including deductions, is allocated to the owners of the corporation and is fully treated as corporate-level tax
2. **Old subchapter S model**: under which the net income is determined on the corporate level and is allocated to the shareholders, but does not preserve the character of corporate-level tax

Blazic (2005) characterizes the full integration as a system where the corporate tax is considered as withholding tax, which is subsequently credited in the full amount, regardless whether the profit is distributed or not.

Proponents of conduit system point out that any separate taxation of corporate income is unfair, since the profits are finally channeled to the shareholders, either as dividend income or in the form of capital gains (Dethier and John, 1998). On the other side, Blazic (2005) argues that this type of dividend taxation may have negative fiscal effects, and may have complicated procedure.

This kind of corporate tax system is not implemented in any of the member states of European Union (Kovacs and Sipos, 2002).

Between these two extreme models, one may find a variety of intermediate models. Further division depends on the level where the integration occurs. For the integration on the corporate level we may distinguish:

- **Dividend-deduction system**[7]:

Under the dividend deduction system the enterprise is treated as entity subject to corporate tax, which pays tax on its taxable income. In case, the profits are distributed in the form of dividend payment, those are deducted from the taxable profits. If the deduction is done in full, the double taxation is eliminated. If it is done for the part of dividends, the double taxation is mitigated.

- **Split-rate system** (Dethier and John, 1998):

Under the split-rate system the mitigation of the "two-tier" tax results from distributed profits – dividends taxed at lower rate than retained earnings.

For the integration on the shareholder level we may have:

- **Imputation system**[8]:

Under the system of imputation some or all of the tax paid by a company may be "imputed" to the shareholders. This is done by: "grossing up" the dividend received by the shareholder, by the some or all the tax paid at the company level, thus the tax paid at the shareholder level is calculated on the grossed up amount of the dividend and by giving the stockholders the tax credit, as compensation for the tax paid at the company level.

- **Schedular treatment system (Blazic, 2005)**:

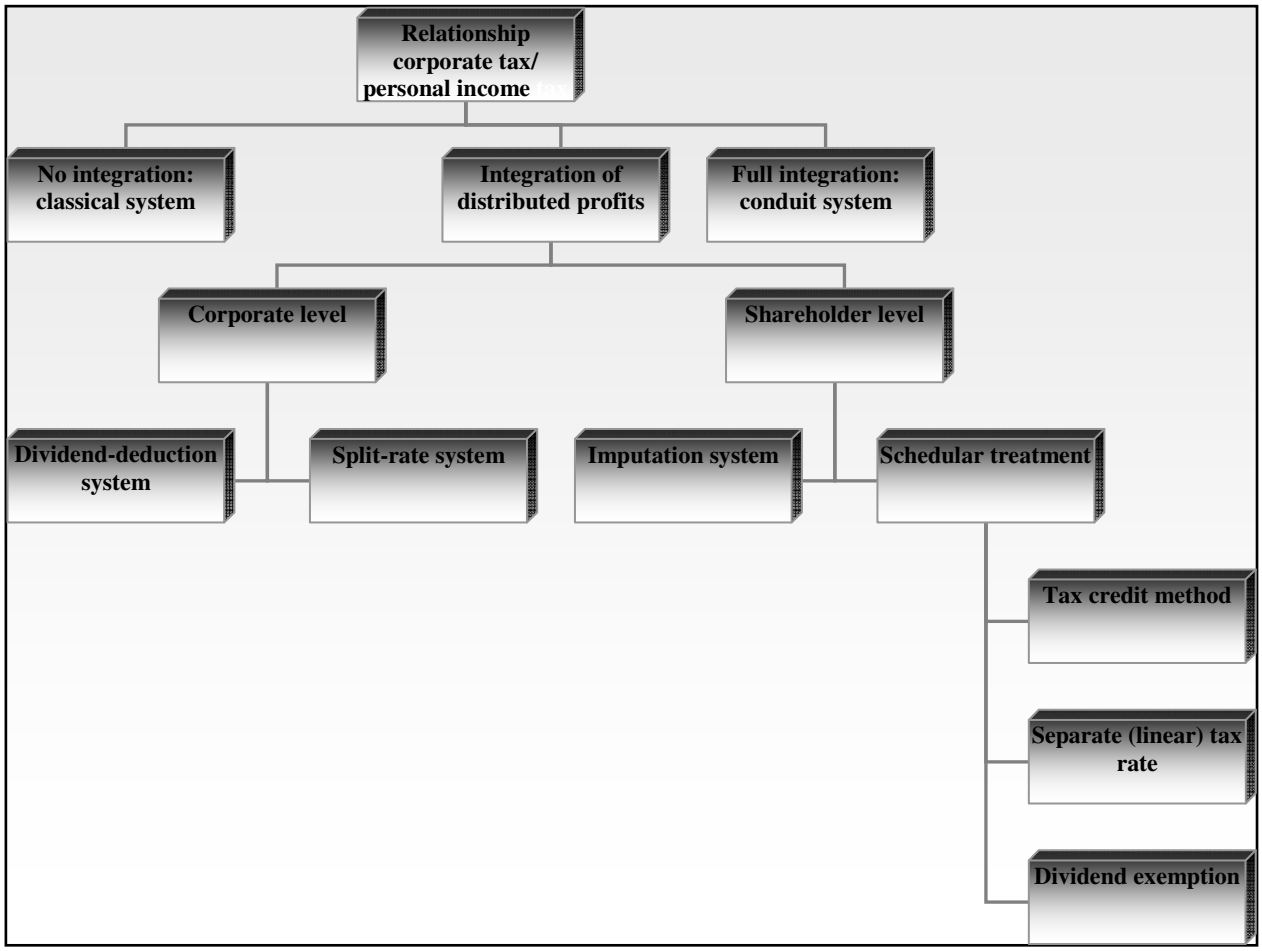
The schedular treatment system has a preferential treatment for dividends without taking the corporate tax into account. There are three different methods, which may be used

[7] Gilder et al., Understanding Taxation Law - An Interactive Approach, 2nd edition, http://www.lexisnexis.com.au/aus/academic/text_updater/gilders/
[8] Gilder et al., Understanding Taxation Law - An Interactive Approach, 2nd edition, http://www.lexisnexis.com.au/aus/academic/text_updater/gilders/

1. **Tax credit method** (Ibid). Under this system the tax credit is deducted from the personal income tax, but without previous grossing up the dividends. As already mentioned, the tax credit is not linked to the corporate tax.
2. **Separate tax rate of dividends** (Ibid). This system applies lower, linear or flat rate on the income distributed to the shareholders. Usually the withholding tax with relatively low rate is applied on dividends. Eventually, two lower rates may be used.

3. **Dividend exemption** (Ibid). The system of dividend exemption eliminates the tax paid by shareholder, either fully; the full tax amount on dividends is exempt or partially; the part of tax is exempt.

Figure 6 Corporate tax systems



Source: Author's edition to Cnossen, 1993

In France the full imputation system - rate of imputation equals the rate of corporate income tax - was established in 1993 and replaced the partial imputation system used since

1966 (Lasfer and Zenonos, 2003). However, the imputation system has never been extended to surcharges, that are currently levied on the corporate income (Bond and Chennells, 2000)

4.2. Dividend taxation

As already mentioned, the dividend payment is one of the possibilities how to distribute the company's current, or retained earnings to the shareholders. Therefore, the dividend provides an incentive to buy and own stocks. However, the taxation plays a crucial role, as the shareholders are interested in the after tax revenue. The goal of this subchapter, is to describe dividend taxation under the French tax law system.

In France the dividends are taxed as ordinary income at the level of the beneficial owner depending on his tax regime (Art. 109 and 116 of C.G.I.). As consequence, we may identify four different dividend taxation regimes contingent on the dividend recipients – individuals, moral persons, tax exempt entities (different type of funds) and foreign shareholders.

4.2.1. Dividends received by individual shareholders

The dividends received by individuals are in general taxed as ordinary income, with a progressive schedule prescribed by the Art 197 of C.G.I. The taxable revenue arising from the dividend payment is determined as follows:

- The tax-free allowance of 40% is applied on the total distributed income as per the Art. 158 of C.G.I., that is only 60% of the dividend income is subject to the personal income tax.
- According to the same article of C.G.I., the individuals are entitled to a fixed annual tax-free allowance set at
    - EUR 3,050 for couples or married paying joint tax
    - EUR 1,525 for singles, widowed or divorced people and married couples taxed separately

- Furthermore, in pursuance of the Art. 200 septies of C.G.I., the dividends are also entitled to the tax credit equivalent to 50% of the received dividend. But this credit is capped at EUR 230 for couple taxed jointly, and at EUR 115 for single or couple taxed separately.

In addition, the dividend income is subject to the social contributions related to the capital revenue at a rate of 12.1% (Art. L136-7-1 of Code de la Sécurité Sociale). However, the part of CSG (5.8%) is deductible from the overall taxable income.

Prélèvement Forfaitaire Libératoire

The Finance Act 2008 (Art. 10) established the optional levy at source system-*Prélèvement Forfaitaire Libératoire* (PFL). Under this system, the tax of 18% is withheld at source on the gross total of the dividends received (Art. 12 of Finance Act 2008 and Art. 187 of C.G.I.). However, as pointed out by Caudy et al. (2009) this PFL system is interesting only for taxpayers falling under the marginal tax rate of 40%, and whose total annual dividend income is higher than EUR 19,700 per single person, and EUR 39,400 for couple. Moreover, the dividends taxed under PFL system are subject to the social security contributions, which are not deductible from the taxable income, and this option is exclusive of all tax allowances and credits as per the Art. 158 and 200 septies of C.G.I.

4.2.2. Dividends received by corporate shareholders

The dividends paid to the companies/moral persons have to be declared as taxable income (Deloitte France Highlights 2008). They are taxed at level of the corporate income tax, unless they fall under the dividend participation exemption regime, or in different words the holding company regime (Le régime des sociétés mères et filiales). Under the participation exemption regime, the dividends received by the mother company from its subsidiary are 95% tax exempt, which results in the effective tax rate of 1.7% (Ibid). The remaining 5% is included in the tax base being deemed expenses incurred with respect to the exempt dividend income (Art. 216 of C.G.I). In accordance with the Art. 145-1 of C.G.I, to qualify for the holding company regime the parent must posses at least 5% of the

subsidiaries capital (EurAudit International 2007), and this participation must be held at least for 2 years.

4.2.3. Dividends received by tax exempt entities

In this paragraph we will focus on the taxation of different investments schemes, as they represent an important proportion of shareholders. In France, the different open-ended mutual funds are constituted as the OPVCM (Organisme de Placement Collectif en Valeurs Mobilières), which mainly takes the form of SICAV (Sociétés d'Investissement à Capital Variable) or FCP (Fonds Communs de Placements)[9]. The main distinction among the SICAV and FCP is the obligation to distribute the income; the SICAV is obligated to do so, whilst the FCP is not.

In general the fund's taxation is based on principle of tax neutrality, in the sense that this should have no influence on the investor's decision to invest directly or via investment scheme, in the same underlying asset. In order to achieve the goal of tax neutrality, the French funds SICAV or FCP are treated as transparent entities (Viitala, 2005). Both are exempt from the corporate tax on their portfolio income, irrespective of the origin (fixed income or variable income instruments) and source (foreign or domestic) of the obtained income. The tax exemption for the SICAV is expressively quoted in the Art. 208-1 bis of C.G.I. Concerning the FCP, the exemption is the direct consequence of the absence of legal identity. The taxation of income arising within an investment scheme occurs exclusively, when the income is distributed by the fund to its investors.

4.2.4. Dividends received by foreign shareholders

In the absence of the harmonization on the European level, the tax rules fall under the jurisdiction of each Member State. Different bilateral tax treaties, so called Double Taxation Treaties (DTT), regulate the "the fair distribution of the tax burden" between two signatory States.

[9] KMPG France Taxation, Funds and Fund Management 2009
http://www.kpmg.com/SiteCollectionDocuments/Fund_Management/France_Funds_Mtg_taxation_2009.pdf

In general, the foreign shareholders are subject to 25% withholding tax applied at source. However, if the fiscal residency of the final beneficial owner is located in a country which concluded DTT with France, this rate may be reduced. The withholding tax is withdrawn by the paying agent, and then may be refunded to the beneficiary upon receipt of specific forms, which proves the beneficiaries identity and fiscal domicile. The complete overview of tax rates prescribed by relevant DTT may be found in the Table 26 in the Appendix.

4.3. Capital gains taxation

The detailed description of the capital gains taxation is beyond the scope of this article, therefore, only the most important aspects will be mentioned.

In accordance with the Art. 150-0 A of C.G.I., the capital gains tax on disposal of shares is not payable, unless the total amount of movable asset transfers (by individuals or legal entities) and other entitlements or shares, exceeds a certain threshold. The threshold is set at EUR 25,000 per taxable unit for the taxation of income earned in 2008, and at EUR 25,730 since 1.1.2009 (Art. 150-0 A of C.G.I). When the total gross amount of shares sales exceeds the above mentioned trigger limit, the capital gains are taxed at a rate of 30.1% as of the first euro (Ibid). The overall effective tax rate may be decomposed as follows:

- Income tax rate - proportional rate of 18%
- CSG of 8.2%
- CRDS of 0.5%
- PS of 2.3%

} non-deductible from the income tax base

In pursuance of the Art 150-0 D bis of the C.G.I., the capital gains tax is decreased under certain conditions, by tax allowance proportional to ownership period. Since 1.1.2006 the allowance of one third is applicable for each year of ownership, after the fifth year[10]. As consequence the capital gains become tax exempt from 1.1.2014 that is after 8 year ownership period. Nevertheless the social security contributions will continue to apply on the total amount of capital gains.

[10] The ownership period is computed as of 1.1.2006 also for the securities acquired before that date

According to the French tax law, the capital losses may be imputed against the gains of the same nature, realized during the same year or in the following ten years. In order to defer the capital losses the threshold has to be exceeded in the year the capital loss occurred[11]. The capital gains realized by non-residents in France, are in general not liable to the French income tax[12]. The same applies for funds, which are treated as tax exempt entities.

Moreover, since 2007 the participation exemption previously applicable only on the dividend distributions is expanded to the capital gains from participation shares (Kesti, 2007). The capital gains falling under the participation exemption regime are 95% tax exempt, the residual 5% is taxable as ordinary capital gain. The conditions which qualify the shares being participation shares are as follows (Kesti, 2008):

- *Shares the dividends from which qualify for the participation exemption* as described in the subchapter 2.2.2
- *Shares the dividends from which do not qualify for the participation exemption, but which have a cost price at least EUR 22,8 million*, on the condition that they are held durably as a strategic participation and entitle the holder to influence or control the subsidiary

4.4. Major tax reforms

The French tax system seems to be perfect in creating tax arbitrage opportunities due to its complicacy and some discriminatory aspects. Moreover, during the period of my research (2003– 2008), the taxation of dividends and capital gains changed, so we can investigate the impact of the tax reform on the investor's behavior. Bolster et al. (1989) in their research showed the tax code changes had a powerful effect on trading behavior. This chapter aims to describe the most important reforms of fiscal regime in France, which had a significant impact on the dividend and capital gains taxation.

[11] La fiscalité françaises 2008
http://www.impots.gouv.fr/portal/deploiement/p1/fichedescriptive_3391/fichedescriptive_3391.pdf
[12] Ibid

The most important reform adopted in France was the abolishment of "avoir fiscal' by Finance Law 2004, which substantially modified the French tax system.

Until 1.1.2005 the French dividends carried a dividend tax credit, the so called "avoir fiscal", in order to extenuate the economic double taxation of dividends. In general, the dividends received by the domestic shareholders during the year 2004 still carried the "avoir fiscal", whilst the dividends paid to the foreign shareholders were already free of imputation credit.

As defined in the subchapter 2.1, the imputation credit is a dividend in the hands of shareholder. Under the imputation system, the dividend received is grossed up by the before mentioned credit for tax income purposes. Then the same amount is deducted from the resulting tax liability.

The rate of "avoir fiscal" prescribed by the law was equal to 50% of the distributed dividend for individual investors and 10% for the corporate shareholders[13].

Though, the imputation credit represented a penalty for the foreign investors, who owned the French dividend paying shares. According to the Art. 119 of C.G.I the non resident investors receiving the dividend were subject to the withholding tax in France. The countries, which signed the Double Taxation Treaty (DTT) with France, were subject to the tax rate embedded in the particular DTT. Moreover, some of the conventions entitled the non residents to the dividend tax credit. However, the rate of "avoir fiscal" differed substantially across various investor clienteles. The resident physical persons were entitled to 50% (10%) of "avoir fiscal", whilst the non resident persons could get on average only 0.35% of the dividend tax credit[14]. Hence the pre-tax value of EUR 1.0035 for a foreign investor had a pre-tax value of EUR 1.5 (EUR 1.1) to a French investor.

The Avoir Fiscal case (Case 270/83 Commission vs. French Republic, 1986, ECR 273) was the first direct– taxation case, which reached the European Court of Justice.

[13]http://www.impots.gouv.fr/portal/dgi/public;jsessionid=EI4GQZDPI5M4ZQFIEMQSFE4AVARW4IV1?paf_dm=popup&paf_gm=content&espId=2&typePage=cpr02&paf_gear_id=500018&docOid=documentstandard_1268

[14] http://www.senat.fr/rap/r00– 386/r00– 38669.html

Thereafter, the Ruding Committee Report 1992 has again underlined that "*the manner in which Member States currently provide relief for the double taxation of corporate profits distributed to individual shareholders in the form of dividends constitutes a source of discrimination against cross-border investment flows*" and stated that "*such discrimination tends to fragment capital markets in the Community ".*

As of January 1, 2005 the French government resolved upon the abolishment of "avoir fiscal". The 50% lump sum deduction[15] (abattement de 50% ou imposition sur une "demi-base") replaced the old system. The tax abatement aimed to eliminate the disparity among investors. It seems the goal was partially fulfilled, as according to the article 158 of the French Tax Code, the "abatement fiscal" concerned not only the dividend paid by the French companies, but as well the dividends from foreign source. Unfortunately, the position of the non resident investor didn't improve. The new system was not applicable to the foreign investors, thus it didn't terminate the discrimination of cross-border investment compared to the domestic one. In this context, the foreign investors are still expected to have strong incentive to sell their stocks as compared to domestic ones, in order to profit indirectly from the tax abatements.

The second major reform in France was the adoption of optional levy at source system- *Prélèvement Forfaitaire Libératoire* (PFL) in 2008. Under this system the investor has the possibility to decide whether he wants to be taxed according to the progressive schedule or at a fixed rate of 18%. But as already mentioned, the PFL system is profitable only for shareholders falling under the marginal tax rate of 40% and whose total annual dividend income is higher than EUR 19,700 per single person and EUR 39,400 for couple.

The remaining modifications of tax system are related to the change of tax rate. The detailed overview of respective tax rates for taxation of dividends and capital gains may be found in the Table 5-10.

[15] Under this mitigated classical system the dividends are subject to income tax at ordinary rates, but only on 50% of their total amount.

Table 5 Tax rates and the rates of social taxes 2003

					DIVIDEND			Capital gains
2003		**Tax rate**	**CSG**	**CRDS**	**PS**	**Avoir Fiscal**	**Abattement fiscal**	**Tax rate**
legal entities		33.33%	3.30%	0%	0%	10%	x	16%
	Annual income (in EUR)							
individuals - progressive taxation dependent on the annual income	0-4191	0.00%	7.50%	0.50%	2%	50%	x	16%
	4191-8242	7.05%	7.50%	0.50%	2%	50%	x	16%
	8242-14506	19.74%	7.50%	0.50%	2%	50%	x	16%
	14506-23489	29.14%	7.50%	0.50%	2%	50%	x	16%
	23489-38218	38.54%	7.50%	0.50%	2%	50%	x	16%
	38218-47131	43.94%	7.50%	0.50%	2%	50%	x	16%
	47131-	49.58%	7.50%	0.50%	2%	50%	x	16%
tax-exempt entities		0.00%	0%	0%	0%	0%	0%	0%
non-residents		25.00%	0%	0%	0%	0%	0%	0%

Source: Author's own compilation

Table 6 Tax rates and the rates of social taxes 2004

					DIVIDEND			Capital gains
2004		**Tax rate**	**CSG**	**CRDS**	**PS**	**Avoir Fiscal**	**Abattement fiscal**	**Tax rate**
legal entities		33.33%	3.30%	0%	0%	10%	x	16%
	Annual income (in EUR)							
individuals - progressive taxation dependent on the annual income	0-4262	0.00%	7.50%	0.50%	2%	50%	x	16%
	4262-8382	6.83%	7.50%	0.50%	2%	50%	x	16%
	8382-14753	19.14%	7.50%	0.50%	2%	50%	x	16%
	14753-23888	28.26%	7.50%	0.50%	2%	50%	x	16%
	23888-38868	37.38%	7.50%	0.50%	2%	50%	x	16%
	38868-47932	42.62%	7.50%	0.50%	2%	50%	x	16%
	47932-	48.09%	7.50%	0.50%	2%	50%	x	16%
tax-exempt entities		0.00%	0%	0%	0%	0%	0%	0%
non-residents		25.00%	0%	0%	0%	0%	0%	0%

Source: Author's own compilation

Table 7 Tax rates and the rates of social taxes 2005

					DIVIDEND			Capital gains
2005		**Tax rate**	**CSG**	**CRDS**	**PS**	**Avoir Fiscal**	**Abattement fiscal**	**Tax rate**
legal entities		33.33%	1.50%	0%	0%	X	100%	16%
	Annual income (in EUR)							
individuals - progressive taxation dependent on the annual income	0-4334	0.00%	7.50%	0.50%	2.3%	X	50%	16%
	4334-8524	6.83%	7.50%	0.50%	2.3%	X	50%	16%
	8524-15004	19.14%	7.50%	0.50%	2.3%	X	50%	16%
	15004-24294	28.26%	7.50%	0.50%	2.3%	X	50%	16%
	24294-39529	37.38%	7.50%	0.50%	2.3%	X	50%	16%
	39529-48747	42.62%	7.50%	0.50%	2.3%	X	50%	16%
	48747-	48.09%	7.50%	0.50%	2.3%	X	50%	16%
tax-exempt entities		0.00%	0%	0%	0%	0%	0%	0%
non-residents		25.00%	0%	0%	0%	0%	100%	0%

Source: Author's own compilation

Table 8 Tax rates and the rates of social taxes 2006

2006		Tax rate	CSG	CRDS	DIVIDEND PS	Avoir Fiscal	Abattement fiscal	Capital gains Tax rate
legal entities		33.33%	3.30%	0%	0%	X	100%	16%
	Annual income (in EUR)							
individuals - progressive taxation dependent on the annual income	0-4412	0.00%	8.20%	0.50%	2.3%	X	50%	16%
	4412-8677	6.83%	8.20%	0.50%	2.3%	X	50%	16%
	8677-15274	19.14%	8.20%	0.50%	2.3%	X	50%	16%
	15274-24731	28.26%	8.20%	0.50%	2.3%	X	50%	16%
	24731-40241	37.38%	8.20%	0.50%	2.3%	X	50%	16%
	40241-49624	42.62%	8.20%	0.50%	2.3%	X	50%	16%
	49624-	48.09%	8.20%	0.50%	2.3%	X	50%	16%
tax-exempt entities		0.00%	0%	0%	0%	0%	0%	0%
non-residents		25.00%	0%	0%	0%	0%	100%	0%

Source: Author's own compilation

Table 9 Tax rates and the rates of social taxes 2007

2007		Tax rate	CSG	CRDS	DIVIDEND PS	Avoir Fiscal	Abattement fiscal	Capital gains Tax rate
legal entities		33.33%	3.30%	0%	0%	X	100%	16%
	Annual income (in EUR)							
individuals - progressive taxation dependent on the annual income	0-5614	0.00%	8.20%	0.50%	2.3%	X	60%	16%
	5614-11198	5.50%	8.20%	0.50%	2.3%	X	60%	16%
	11198-24872	14.00%	8.20%	0.50%	2.3%	X	60%	16%
	24872-66679	30.00%	8.20%	0.50%	2.3%	X	60%	16%
	66679-	40.00%	8.20%	0.50%	2.3%	X	60%	16%
tax-exempt entities		0.00%	0%	0%	0%	0%	0%	0%
non-residents		25.00%	0%	0%	0%	0%	100%	0%

Source Author's own compilation

Table 10 Tax rates and the rates of social taxes 2008

2008		Tax rate	CSG	CRDS	DIVIDEND PS	Avoir Fiscal	Abattement fiscal	Capital gains Tax rate
legal entities		33.33%	3.30%	0%	0%	X	100%	18%
	Annual income (in EUR)							
individuals - progressive taxation dependent on the annual income	0-5687	0.00%	8.20%	0.50%	2.3%	X	60%	18%
	5687-11344	5.50%	8.20%	0.50%	2.3%	X	60%	18%
	11344-25195	14.00%	8.20%	0.50%	2.3%	X	60%	18%
	25195-67546	30.00%	8.20%	0.50%	2.3%	X	60%	18%
	67546-	40.00%	8.20%	0.50%	2.3%	X	60%	18%
tax-exempt entities		0.00%	0%	0%	0%	0%	0%	0%
non-residents		25.00%	0%	0%	0%	0%	100%	0%

Source: Author's own compilation

In France according to the above compilation we may identify 4 market participant groups, which differ in terms of their dividend taxation and their capital gains taxation. These are individuals and corporations, both having preference for dividends, tax-exempt organizations, which are indifferent between dividends and capital gains, and foreign shareholders with preference of capital gains. Consequently, we expect the tax motivated trading occurs on the French market.

Based on the major tax code modifications we may formulate the first hypotheses:

Hypothesis 1: *The abnormal volumes are the most pronounced in 2004, the year before the abolition of "avoir fiscal".*

Hypothesis 2: *The abnormal volumes are the lowest in 2008, due to the equilibration of capital gains and dividend taxation.*

5. The model

The avoidance of taxes is the only intellectual pursuit that carries any reward.

John Maynard Keynes

The main objective of this research is to find out, if the taxation has an influence on investor's trading pattern around the ex-dividend date. For this purpose we will use the methodology composed of 3 steps.

- Formation of no arbitrage boundaries using:

    - Firstly the model proposed by Elton and Gruber (1970) with no transaction costs.
    - Secondly applying the costly arbitrage model initially used by Kalay (1982) and later on employed by many authors.

    Both models will be slightly transformed in order to capture the specific characteristics of the French tax system.

- Computation of price drop, which indicates if the no-arbitrage condition holds. In order to compute the price drop we will employ several measures:

    - The computation of raw price ratio.
    - The computation of market adjusted ratio according to Dasilas (2007) or Liljeblom et al. (2001).
    - The computation of price ratio adjusted for heteroskedasticity (statistics designed by Michaely, 1991).

- Estimation of abnormal volume within the event window, that is a time period before and after the ex-dividend day. We will use the methodology adopted by Dyl (1977).

5.1. Arbitrage boundaries

5.1.1. Arbitrage model with no transaction costs

Following the model suggested by Elton and Gruber (1970), the investor is indifferent between selling after or before the ex-dividend date if the equation (18) holds. We assume the investor is risk neutral and there are no restrictions on short sales.

$$(1-t_g).(P_{cum}-P_0)=D.(1-t_d)+(1-t_g).(\overline{P}_{ex}-P_0)) \quad (18)$$

Where

t_d - tax rate on dividends

t_g - tax rate on capital gains

P_{cum} - price of the stock cum-dividend

$\overline{P}_{ex}$ -expected price on the ex-dividend day

P_0 - price at witch the stock was initially purchased

D - amount of dividend per share

Rearranging, we get the ex-dividend day ratio or tax-induced preference relative to capital gains:

$$\lambda=\frac{P_{cum}-\overline{P}_{ex}}{D}=\frac{1-t_d}{1-t_g} \quad (19)$$

- $\lambda=1 \Rightarrow t_d=t_g$, equal taxation
- $\lambda>1 \Rightarrow t_d<t_g$, more favorable taxation of dividends
- $\lambda<1 \Rightarrow t_d>t_g$, more favorable taxation of capital gains

If the ex-dividend ratio differs across various groups of investors, the heterogeneity of the tax system potentially creates a tax-arbitrage opportunities (Sander, 2007).

Suppose $P_{cum}-\overline{P}_{ex}=D$

If $\lambda>1$, the investor would be willing to capture the dividend

If $\lambda < 1$, the investor would be willing to avoid the dividend

For the equal taxation of dividends and capital gains:

If $P_{cum} - \overline{P}_{ex} > D$, the investor would be willing to sell the share P_{cum} (avoid dividend)

If $P_{cum} - \overline{P}_{ex} < D$, the investor would be willing to buy the share P_{cum} (capture dividend)

5.1.2. Costly arbitrage model

Whether the tax arbitrage opportunities arising from investor's heterogeneity could be practically employed depends on the transaction costs. The Elton and Gruber (1970) model doesn't take them into consideration. The reason is, that in their model the motivation to sell/buy is unrelated to the dividend (Lakonishok and Vermalaen, 1986). The shareholders doesn't decide whether to trade or not, only when (Ibid).

For further research, we use the costly arbitrage model proposed by Kalay (1982). The same is used in many ex-dividend day studies, ex. see Lasfer (1995), Michaely and Murgia (1995), Boyd and Jagannathan (1994), McDonald (2001), Liljeblom et al. (2001), Hu and Tseng (2004), Sander (2007) etc.

The model serves us to derive the conditions, under which the various classes of investors don't have a tax arbitrage opportunities from long arbitrage (purchasing the share on cum-day and selling it ex-day) or short arbitrage (selling the share on cum-dividend day and purchasing it back on the ex-dividend day). As the time is too short, we assume the interest rate being zero.

Consider first the long arbitrage, thus the investor buying the stocks cum-dividend and reselling them ex-dividend. The dividend capturing activity is non-profitable as long as:

$$(1 - t_g).\{\overline{P}_{ex}(1 - c_{tr}) - P_{cum}(1 + c_{tr})\} + D.(1 - t_d) \leq 0 \qquad (20)$$

After rearrangement of the equation (20), the no-arbitrage condition can be expressed:

$$\lambda = \frac{P_{cum} - \overline{P}_{ex}}{D} \geq \frac{1 - t_d}{1 - t_g} - 2c_{tr}\frac{\overline{P}}{D} \tag{21}$$

Where

c_{tr} is one-way proportional transaction cost and

$\overline{P}$ is the average stock price (average over actual cum-day price and expected ex-day price)

Second consider short arbitrage: investor selling the shares on cum-day and repurchasing them on the ex-day. The net gain from the strategy is negative or zero if:

$$(1 - t_g).\{P_{cum}(1 - c_{tr}) - \overline{P}_{ex}(1 + c_{tr})\} \leq D.(1 - t_d) \tag{22}$$

By rearranging we get

$$\lambda = \frac{P_{cum} - \overline{P}_{ex}}{D} \leq \frac{1 - t_d}{1 - t_g} + 2c_{tr}\frac{\overline{P}}{D} \tag{23}$$

Combining the equations (21) and (23) we get the no-arbitrage conditions for different tax clienteles on the market.

$$\frac{1 - t_d}{1 - t_g} - 2c_{tr}\frac{\overline{P}}{D} \leq \frac{P_{cum} - \overline{P}_{ex}}{D} \leq \frac{1 - t_d}{1 - t_g} + 2c_{tr}\frac{\overline{P}}{D} \tag{24}$$

5.1.3. Arbitrage model for the French market

As described in the chapter 4, the full imputation system was established in France until 2005. Therefore all distributed dividends carried a tax credit, the so called “avoir fiscal”. The system was latterly replaced by lump sum deduction system “abatement fiscal”, sc. only the part of dividend was taxable.

More formally the investors after tax profit, in presence of "avoir fiscal", may be expressed as $(1+AF)(1-t_d)$, where AF stands for "avoir fiscal". Under the lump sum deduction system the net earnings equal to $(1-xt_d)$, where x is the proportion of the taxable dividend.

Taking into account the presence of "avoir fiscal" and lump sum deduction the equations 19 and 24 result in:

$$\lambda = \frac{P_{cum} - \overline{P}_{ex}}{D} = \frac{(1+AF)(1-xt_d)}{1-t_g} \tag{25}$$

$$\frac{(1+AF)(1-xt_d)}{1-t_g} - 2c_{tr}\frac{\overline{P}}{D} \le \frac{P_{cum} - \overline{P}_{ex}}{D} \le \frac{(1+AF)(1-xt_d)}{1-t_g} + 2c_{tr}\frac{\overline{P}}{D} \tag{26}$$

Where

AF equals zero for the period 2005-2008, x is set by the French tax code

Contrary x equals to one during the years 2003 and 2004, and the magnitude of AF for 2003-2004 is 50% for individuals and 10% for legal entities.

5.2. Ex-day price drop

To compute the ex-dividend price drop we will employ several measures

1. First we calculate the classical ex-dividend price drop, the so called *raw price ratio*. The average ex-dividend price drop to the dividend UNADJUSTED for market movements is calculated as

$$RPR = \frac{1}{N}\sum_{i=1}^{N}\frac{P_{cum,i} - \overline{P}_{ex,i}}{D_i} \tag{27}$$

Where

$P_{cum,i}$ - price of the stock cum-dividend

$\overline{P}_{ex,i}$ -expected price on the ex-dividend day

D_i - amount of dividend per share

N - is the sample size of stocks

2. Second we will adjust the dividend price drop to the market movements. As pointed out by Kalay (1982) or Michaely (1991), the closing price on the ex-dividend day is influenced by the share's normal daily return. Kalay (1982) argued, if we use the closing prices on the cum-dividend and the ex-dividend day, the ex-dividend price drop is biased downward. This problem is solved by computing the average ex-dividend price drop ADJUSTED for market movements (*market adjusted price ratio*) according to the following formula

$$MAPR = \frac{1}{N}\sum_{i=1}^{N}\frac{P_{cum,i} - \left(\overline{P}_{ex,i} - R^{*}_{m,i}P_{cum,i}\right)}{D_i} \tag{28}$$

Where the additional variable $R^{*}_{m,i}$ stands for the daily market return as it is proxied by Euronext Paris composite stock index – CAC40.

3. The third measure we use is the price ratio adjusted for heteroscedasticity. Several authors like Eades et al. (1985), Michaely (1991), Bell and Jenkinson (2002), Dasilas (2007) underlined, that the price ratios as computed above, suffers from heteroskedasticity. The statistic correcting for heteroscedasticity, designed by Michaely (1991), is computed as follows

$$HAPR = \frac{\sum_{i=1}^{N}\frac{d_i^2}{\sigma_i^2}\left\{\frac{P_{cum,i} - \left(\overline{P}_{ex,i} - R^{*}_{m,i}P_{cum,i}\right)}{D_i}\right\}}{\sum_{i=1}^{N}\frac{d_i^2}{\sigma_i^2}} \tag{29}$$

Where the additional variables

d_i^2 stands for the dividend yield on the stock i computed as cash dividend over the cum-dividend price

σ_i^2 is the return variance

5.3. Estimation of an abnormal volume

In order to find out the trading pattern on the market around the ex-dividend we need to calculate the abnormal volume. An intuitive definition of abnormal trading volume can be found in Sander (2007), who defines it as

$$AV_{it} = V_{it} - \overline{V_i} \tag{30}$$

Where

AV_{it} is the abnormal trading volume for security *i* on the day *t*

V_{it} is the actual volume of security *i* on the day *t*

$\overline{V_i}$ is the average daily volume of security *i* during the rest of the year

According to Dyl (1977), the normal trading volume in the stocks of specific company is predominantly determined by the number of shareholders in the firm, amount of outstanding shares, and the degree to which the company is closely held. That is, to such a degree that the individual's decision to buy/sell the stocks influences the trading volume, the number of stakeholder who possesses the particular stock will affect the average number of transactions for the given stock during the given period. But it could happen, the trading volume in particular share is much higher than that in the stocks of another company with resembling market capitalization; so called *high level of investor „interest" in a share.* Heavy trading volumes related to *high level of investor „interest"* phenomenon results from heterogeneous reaction to a new information about the security (Ibid). Karpoff (1986) came to the same conclusion – *„Unusually high volume can result from heterogeneous reactions to the information"*

The relation of information on the trading volume is examined in much empirical literature. For further discussion see Pfleidered (1984) and Varian (1985), examining the influence of private information and its market aggregation on the traded volume, Bamber (1985, 1986) and her effect of information with the „surprise content", or Ball and Brown (1968) studying the impact of information contained in accounting income numbers.

In addition the market influences have to be taken into account when defining the usual trading volume. Beaver (1968) found out a strong positive rapport between the total market volume and individual company's volume. Such a relationship can be attributed to the factors, which influence the trading volume in lot of shares simultaneously. The market imperfections and transaction costs influence the trading volume in negative way Karpoff (1986), thus lower the daily trade size. Political or economical aspects may affect the traded volumes in both ways.

In estimation of abnormal trading volume we will follow the methodology established by Dyl (1977) composed from 3 steps. The same approach was employed in the work of Bolster, Lindsey, and Mitrusi (1989). Bremer and Kato (1996), and Morse (1982) used a residual to out-of-sample approach, but essentially, they arrived to the same results.
The above mentioned methodology consists of the following steps.

- Determination of relative daily volume for the market *m* and the security *i*
- Estimation of the expected/normal trading volume
- Computation of the abnormal trading volume

1. Determination of relative daily volume for the market *m* and the security *i*

$$V_{it} = \frac{Vol_{it}}{\frac{1}{T}\sum_{t=1}^{T} Vol_{it}} \tag{31}$$

$$V_{mt} = \frac{Vol_{mt}}{\frac{1}{T}\sum_{t=1}^{T} Vol_{mt}} \tag{32}$$

Where

T is the number of trading days in particular year minus the days within the event window

Vol_{it} is the actual trading volume of security i on the day t

V_{it} is the relative daily volume of security i during on the day t

Vol_{mt} is the actual trading volume on the overall market on the day *t*

V_{mt} is the relative daily volume for the overall market on the day *t*

Application of the relative volumes V_{it} and V_{mt} eliminate the biases, that may arise from trend in the data (Dyl, 1977). The noise that could occur as a consequence of trends in the volume traded is smoothed by adjusting the actual daily trading volume by the yearly average. Another advantage of use of the relative volume is the suppression of domination of firms with large trading volumes in the sample.

2. Estimation of the expected/normal trading volume

As already mentioned, the market conditions may influence the trading volumes in the securities of a particular company. In order to determine the level of normal trading, we will regress the relative daily volume V_{it} in a given security on the relative daily volume in the overall market V_{mt}. This technique allows us to take the market influence into account. The ordinary least squares regression model is expressed:

$$V_{it} = \alpha_i + \beta_i V_{mt} + \varepsilon_{it} \tag{33}$$

Equation 33 is a measure of expected/normal trading volume for an individual security *i* given the entire market volume. The conditional expected traded volume in the share *i* during the particular day *t* is done as:

$$E(V_{it} | V_{mt}) = \alpha_i + \beta_i V_{mt} \tag{34}$$

3. Computation of the abnormal trading volume

The estimates from previous step are used to measure the abnormal volume AV_{it} for the share *i* on the day *t*.

$$AV_{it} = V_{it} - E(V_{it} | V_{mt}) = V_{it} - \hat{\alpha}_i - \hat{\beta}_i V_{mt} \tag{35}$$

AV_{it} is the percentage by which the trading volume on the day t is abnormally under/above the daily average.

If $AV_{it} > 0$ the volume traded on the day *t* is abnormally high

If $AV_{it} < 0$ the volume traded on the day *t* is abnormally low

The observation of abnormal volume itself does not give a satisfactory answer to the research question – if any tax motivated trading occurs on the NYSE Euronext. The abnormal trading volumes were found as well in the countries with no taxation of capital gains and dividends ex. Athens Stock Exchange (Milonas and Travlos, 2001, Dasilas, 2007, Vassilis, 2009). For that reason we introduced the non-arbitrage boundaries combined with the measurement of price drop. This results in the consequent hypothesis:

Hypothesis 3: *The price drop outside the no arbitrage boundaries is accompanied with a significantly high abnormal volume.*

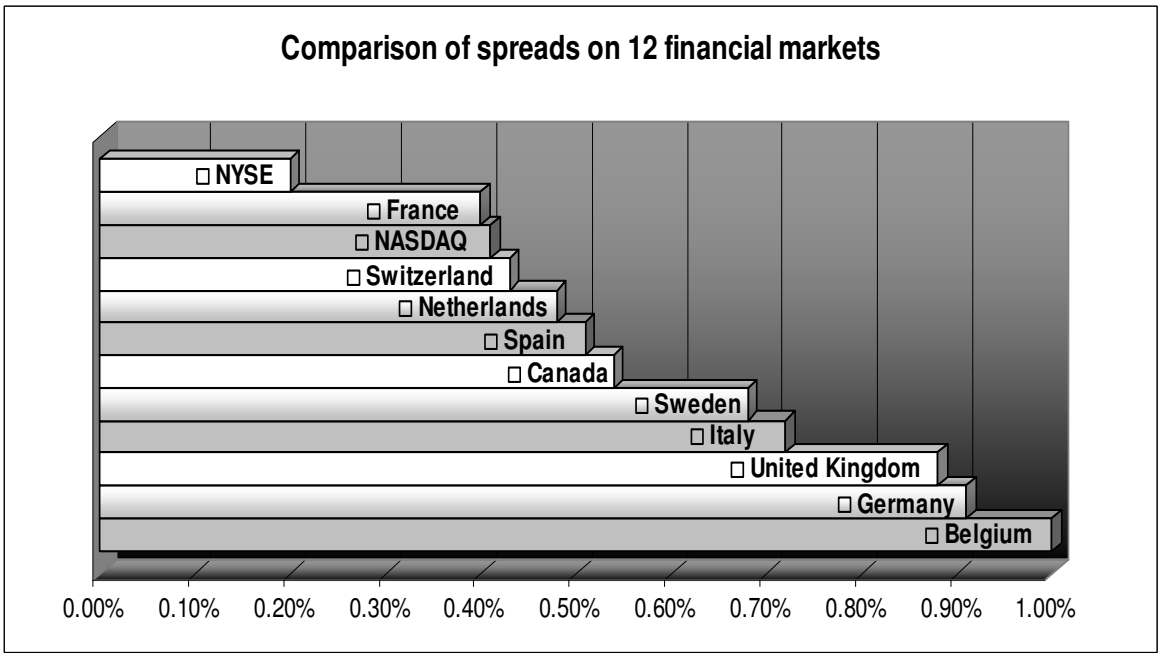
6. Results

6.1. Data

The daily share prices as well as the daily trading volumes quoted on the NYSE Euronext are used to examine the stock price and the trading volume behavior during the ex-dividend period. These two indicators will be applied in order to find out if the tax-induced trading occurs on the French market around ex-days.

The French stock market has some particular features, which provide an ideal background for the purposes of this research. Firstly, the NYSE Euronext is the stock market which records one of the lowest spreads and volatility (Jain, 2001) and it records low transaction costs (Davydoff et al., 2002). The Figure 7 compares the spreads on 12 financial markets. NYSE and the French stock market are the ones with the lowest spread. Low volatility and high transaction costs may discourage the investors from trading. Secondly the French tax system seems to be perfect in creating tax arbitrage opportunities due to its discriminatory aspects – the tax rates differ substantially across the various investor groups. Moreover, during the period of my research (2003-2008), the taxation of dividends changed so we can investigate the impact of the tax reform on the investor's behavior. Thirdly the evidence of tax induced trading from France is very limited. This research aims to fill-in the gap by investigating how the taxation aspects affect the trading behavior around the ex-dividend date.

Figure 7 Comparison of spreads on 12 financial markets



Source: Davydoff et al., 2002

The closing and opening prices, the daily trading volumes, the bid-ask spreads, the dividend rates and the ex-date were obtained from several sources - from yahoo finance and Bloomberg. Our entire sample period is from 1st January 2003 to 31st December 2008 and consists of 40 securities chosen from the 100 most traded securities on the NYSE Euronext. The securities on which any corporate action took place are not included in the sample in order to avoid the contamination of our results. In 2009 the French companies have tremendously distributed the choice dividend; therefore the year 2009 is excluded from the research period. Moreover the 40 securities fulfill the following criteria:

- The price data and trading volume are available for each trading date during the research period.
- The securities are traded daily – this condition is crucial as the thin trading may lead to biased estimates of market model (Brown and Warner, 1985).
- The securities are taxed under the French legislation, it means the tax is withheld in France.

6.2. Arbitrage boundaries with no transaction costs

The Table 12 shows the quasi arbitrage boundaries on the French market for different tax clienteles without taking the transaction costs into account.

Table 11 Quasi-arbitrage boundary with no transaction costs

2003			2004		
legal entities		**0.86373404**	**legal entities**		**0.86373404**
	Annual income (in EUR			**Annual income (in EUR**	
individuals	0-4191	**1.824324324**	**individuals**	0-4262	**1.824324324**
	4191-8242	**1.681418919**		4262-8382	**1.685878378**
	8242-14506	**1.424189189**		8382-14753	**1.436351351**
	14506-23489	**1.233648649**		14753-23888	**1.251486486**
	23489-38218	**1.043108108**		23888-38868	**1.066621622**
	38218-47131	**0.933648649**		38868-47932	**0.960405405**
	47131-	**0.819324324**		47932-	**0.849527027**
tax-exempt entities		**1**	**tax-exempt entities**		**1**
non-residents		**0.75**	**non-residents**		**0.75**

2005			2006		
legal entities		**0.77579369**	**legal entities**		**0.754365119**
	Annual income (in EUR			**Annual income (in EUR**	
Individuals	0-4334	**1.129166667**	**Individuals**	0-4412	**1.125**
	4334-8524	**1.088511905**		4412-8677	**1.084345238**
	8524-15004	**1.015238095**		8677-15274	**1.011071429**
	15004-24294	**0.960952381**		15274-24731	**0.956785714**
	24294-39529	**0.906666667**		24731-40241	**0.9025**
	39529-48747	**0.87547619**		40241-49624	**0.871309524**
	48747-	**0.842916667**		49624-	**0.83875**
tax-exempt entities		**1**	**tax-exempt entities**		**1**
non-residents		**0.75**	**non-residents**		**0.75**

2007			2008		
legal entities		**0.754365119**	**legal entities**		**0.772764268**
	Annual income (in EUR			**Annual income (in EUR**	
Individuals	0-5614	**1.111904762**	**Individuals**	0-5687	**1.13902439**
	5614-11198	**1.072619048**		5687-11344	**1.098780488**
	11198-24872	**1.011904762**		11344-25195	**1.036585366**
	24872-66679	**0.897619048**		25195-67546	**0.919512195**
	66679-	**0.826190476**		67546-	**0.846341463**
tax-exempt entities		**1**	**tax-exempt entities**		**1**
non-residents		**0.75**	**non-residents**		**0.75**

Source: Author's own calculations

The quasi arbitrage boundaries or ex-day ratio λ is computed according to the following formula $\lambda = \frac{1-t_d}{1-t_g}$, where t_d stands for the tax rate on dividends and t_g for the tax rate on capital gains. The investors having $\lambda < 1 \Rightarrow t_d > t_g$, are taxed more favorably on capital gains. Consequently the legal entities and foreign investors during 2003-2008 have capital gains preference. If they don't own the shares they will be better off buying the stock ex-dividend. The non-taxable entities having $\lambda = 1 \Rightarrow t_d = t_g$ are indifferent between capital gains and dividends within the whole research period, because both incomes are taxed equally. The individual's preferences are dependent on the income category to which they belong to. In general the low income groups prefer the dividend payments, as their $\lambda > 1$, which means more favorable taxation of dividends ($\lambda > 1 \Rightarrow t_d < t_g$). Contrary the high income groups have capital gains preference.

The impact of the tax reform is clearly reflected on ex-day ratios. In other words, the change of fiscal law impacted and changed the shareholder's preferences. In 2003 and 2004, 5 of 7 individual categories have $\lambda > 1$ or dividend preference, whilst in 2005 and 2006 only 3 of 7 groups still prefer the dividend payment. In 2007 and 2008, when the taxable base for dividends increased from 50% to 60%, 3 of 5 individual's categories favored the dividend income over capital gains.

Table 12 Summary of strategies dependent on ex-day ratio

	Strategy on cum-dividend day	Strategy on ex-dividend day
λ **<1**	Sell	Buy
λ **>1**	Buy	Sell
λ **=1**	Indifference	Indifference

Author's own compilation

Reminding the Formula (19), the equilibrium equation may be expressed $\lambda = \frac{P_{cum} - \overline{P}_{ex}}{D} = \frac{1-t_d}{1-t_g}$. As per Table 11, different groups of investors have different ex-day ratios, whilst the price drop on the ex-dividend date is a unique value. Therefore the equilibrium on the overall market is not achieved. In other words the heterogeneity of the tax system in France potentially creates tax-arbitrage opportunities (Sander, 2007). Supposing zero transaction costs, the investors may be better off if trading among them during the ex-dividend period. The individuals may increase their profit by using the

dividend capture strategies, that is buying the shares cum-dividend. On the other hand, for the legal entities and the non-resident investors the capital gains are more profitable, as they are taxed less heavily. These entities have an incentive to use dividend avoidance strategies, that is sell the stock cum-dividend or buy it ex-dividend. The tax-exempt entities have no incentive to trade around the ex-date if the price drop and the dividends are equal. However, the transaction costs cannot be neglected. If the tax arbitrage opportunities may be seized in reality highly depends on magnitude of transaction costs.

6.3. Transaction costs

On the financial markets the participants face to two types of trading costs: explicit and implicit trading costs (Davydoff et al., 2002). The explicit trading costs embody the brokerage fees paid to intermediaries processing the order and taxes. The implicit costs are related to the difference between the buy and sell price, which may arise at a given point of time.

For the purpose of this research, the transaction costs will be approximated by average bid-ask spread which is computed as simple average of the spreads of the 40 most traded stocks listed on the NYSE Euronext. This approximation is accurate, as the bid-ask spread is a major component of total trading costs (de Jong et al., 1994). Table 13 summarizes the bid-ask spreads for the period 2003-2008.

Table 13 Bid-ask spread on Euronext Paris 2003-2008

	BID-ASK SPREAD
2003	0.1908%
2004	0.1891%
2005	0.2071%
2006	0.2474%
2007	0.3013%
2008	0.2991%

Source: Author's own calculations

According to our results the spread is at 0.1891% to 0.3013% during the research period. Within the years 2003-2004 the spread was fairly stable, with values around 0.2%. The sharp increase may be observed during the period 2006-2008, when it had increased to

0.3%. Our results are very similar to those of London Economics report on equity markets (2002). They reported the spread at 0.18% to 0.20% in 2001.

6.4. Arbitrage boundaries with transaction costs

The Tables 14-18 summarize up the boundaries of costly arbitrage model for different investor classes during the period 2003-2008. In our computations we assumed fixed transaction costs 0.1908%, 0.1891%, 0.2071%, 0.2474%, 0.3013%, 0.2991% for years 2003-2008 respectively, and used the average dividend yield computed separately for each year for our securities sample.

It is worthy to mention, that such a boundaries are not strictly binding, due to the uncertainty about the ex-dividend price drop (Liljeblom et al., 2001). Only the tax variables are well known ex-ante.

Table 14 Quasi-arbitrage boundaries with transaction costs 2003

Investor class	Annual income of individuals (in EUR)	Lower bound	Upper bound
legal entities		0.670716199	1.05675188
individuals	0-4191	1.631306484	2.017342165
	4191-8242	1.488401078	1.874436759
	8242-14506	1.231171349	1.61720703
	14506-23489	1.040630808	1.426666489
	23489-38218	0.850090268	1.236125949
	38218-47131	0.740630808	1.126666489
	47131-	0.626306484	1.012342165
tax-exempt entities		0.80698216	1.19301784
non-residents		0.55698216	0.94301784

Source: Author's own calculations

Table 15 Quasi-arbitrage boundaries with transaction costs 2004

Investor class	Annual income of individuals (in EUR)	Lower bound	Upper bound
legal entities		0.573104211	1.154363868
individuals	0-4262	1.533694496	2.114954153
	4262-8382	1.39524855	1.976508207
	8382-14753	1.145721523	1.72698118
	14753-23888	0.960856658	1.542116315
	23888-38868	0.775991793	1.35725145
	38868-47932	0.669775577	1.251035234
	47932-	0.558897198	1.140156856
tax-exempt entities		0.709370171	1.290629829
non-residents		0.459370171	1.040629829

Source: Author's own calculations

Table 16 Quasi-arbitrage boundaries with transaction costs 2005

Investor class	Annual income of individuals (in EUR)	Lower bound	Upper bound
legal entities		0.335797109	1.215790272
individuals	0-4334	0.689170085	1.569163248
	4334-8524	0.648515323	1.528508486
	8524-15004	0.575241514	1.455234677
	15004-24294	0.520955799	1.400948962
	24294-39529	0.466670085	1.346663248
	39529-48747	0.435479609	1.315472772
	48747-	0.402920085	1.282913248
tax-exempt entities		0.560003418	1.439996582
non-residents		0.310003418	1.189996582

Source: Author's own calculations

Table 17 Quasi-arbitrage boundaries with transaction costs 2006

Investor class	Annual income of individuals (in EUR)	Lower bound	Upper bound
legal entities		0.48859757	1.020132668
individuals	0-4412	0.859232451	1.390767549
	4412-8677	0.818577689	1.350112787
	8677-15274	0.745303879	1.276838978
	15274-24731	0.691018165	1.222553263
	24731-40241	0.636732451	1.168267549
	40241-49624	0.605541975	1.137077073
	49624-	0.572982451	1.104517549
tax-exempt entities		0.734232451	1.265767549
non-residents		0.484232451	1.015767549

Source: Author's own calculations

Table 18 Quasi-arbitrage boundaries with transaction costs 2007

Investor class	Annual income of individuals (in EUR)	Lower bound	Upper bound
legal entities		0.545041019	0.963689219
individuals	0-5614	0.902580662	1.321228862
	5614-11198	0.863294948	1.281943148
	11198-24872	0.802580662	1.221228862
	24872-66679	0.688294948	1.106943148
	66679-	0.616866376	1.035514576
tax-exempt entities		0.7906759	1.2093241
non-residents		0.5406759	0.9593241

Source: Author's own calculations

Table 19 Quasi-arbitrage boundaries with transaction costs 2008

Investor class	Annual income of individuals (in EUR)	Lower bound	Upper bound
legal entities		0.516863853	1.028664684
individuals	0-5687	0.883123975	1.394924806
	5687-11344	0.842880072	1.354680903
	11344-25195	0.78068495	1.292485781
	25195-67546	0.66361178	1.175412611
	67546-	0.590441048	1.102241879
tax-exempt entities		0.744099584	1.255900416
non-residents		0.494099584	1.005900416

Source: Author's own calculations

The non arbitrage interval on the NYSE Euronext is small comparing to other ex-dividend studies due to the slight bid ask spread. The research conducted on the Estonian stock market resulted in 3-times bigger interval. The widest non arbitrage boundaries are shown in the years 2004 and 2005, despite the relatively low transaction costs. This phenomenon is caused by high $\frac{\overline{P}}{D}$ ratio.

For the non taxed domestic investors, which are equally taxed on the dividend and capital gains income the non arbitrage interval is symmetrically centered around 1. These entities have no motivation to engage in arbitrage around the ex-dividend date, unless the price drop differs from the dividend amount. The foreign investors having capital gains preference are expected to use dividend avoidance strategies. Owing to the high tax rate on dividends, they may increase their profit by transferring temporary their stock to the resident entities or individuals. The anticipated ex-day ratio for non-residents is less than 1,

and the overall interval lies below 1 or slightly above. Very similar non arbitrage conditions are obtained for the legal entities, which are more heavily taxed on the dividend revenue. The higher dividend tax rate would imply the dividend ratio less than one, and the interval placed between cca 0.5 and 1.05; the biggest one situated between 0.335797109 and 1.215790272 in 2005. The domestic individual investors are in an opposite situation. Enjoying different dividend related benefits, they employ the dividend capture strategies in order to boost their profit. The no arbitrage boundary, which ensures for them to be indifferent between the capital gains and the dividends, ranges the highest among all investor clienteles. Moreover, in 2003 and 2004 the dividend carried the "avoir fiscal" causing the lower bound of arbitrage interval to be greatly above 1.

The equilibrium in economy is achieved, when none of the investor classes have explicit arbitrage opportunities from long arbitrage – buying shares cum-dividend and selling them ex-dividend, or from short arbitrage – selling stock cum-dividend and repurchasing it ex-dividend. Following the research of Boyd and Jagannathan (1994) or Liljeblom et al. (2001), the overall non arbitrage interval in the economy is set as the intersection of non arbitrage boundary of each tax clientele. Therefore, the equilibrium on the market may be depicted by the highest value of lower bound and the lowest value of the higher bound. The Table 20 resumes our results:

Table 20 Non arbitrage interval for the overall economy

	Lower bound	Upper bound
2003	1.631306484	0.943017840
2004	1.533694496	1.040629829
2005	0.689170085	1.189996582
2006	0.859232451	1.015767549
2007	0.902580662	0.959324100
2008	0.883123975	1.005900416

Source: Author's own calculations

In the years 2003 and 2004 there is "no equilibrium" in the economy as the lower bound is higher than the upper bound of the non-arbitrage interval. Therefore it seems the market cannot eliminate the arbitrage opportunities, and the ex-dividend period trading is still beneficial for some investor groups. But such a result may be misleading. Firstly, as already mentioned the arbitrage boundaries are not strongly binding. Secondly, the roots of equilibrium nonexistence are the individuals with low tax burden. However, it is improbable that these investors may participate in the tax arbitrage. Taking the average

share price into account, the individuals in the lowest tax bracket are able to buy 100 shares per year when spending their whole income on shares. Consequently they represent a group of low interest for the other arbitrageurs. And as underlined by McDonald (2001), when the dividends are small comparing to the transaction costs, the arbitrage might be unprofitable.

In order to construct more realistic non arbitrage interval, we will consider only the individuals in the higher tax brackets. The new equilibrium frontiers are presented in the Table 21.

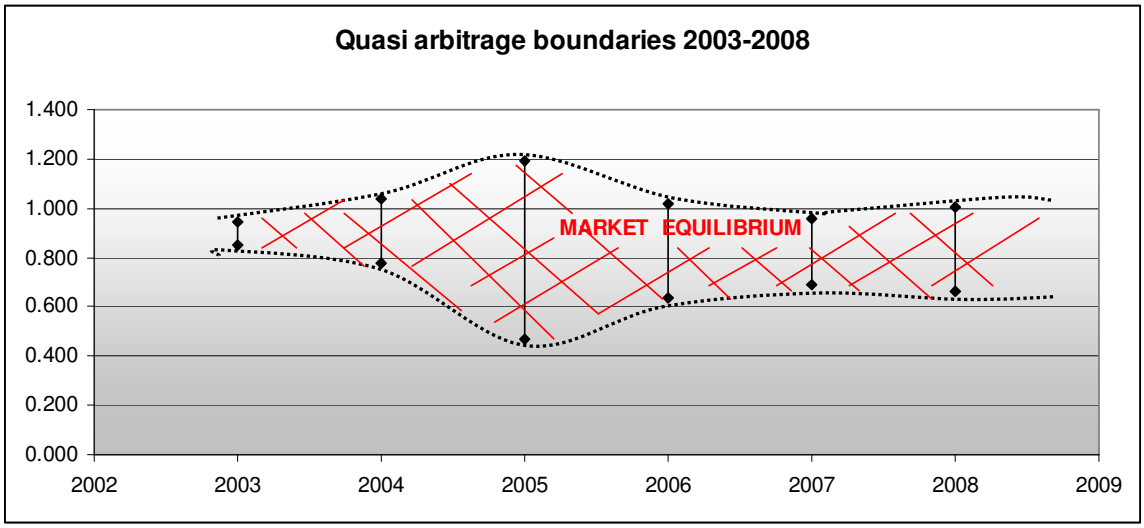
Table 21 Market equilibrium

	Lower bound	Upper bound	Equilibrium
2003	0.850090268	0.943017840	(0.850; 0.943)
2004	0.775991793	1.040629829	(0.776; 1.041)
2005	0.466670085	1.189996582	(0.467; 1.190)
2006	0.636732451	1.015767549	(0.637; 1.016)
2007	0.688294948	0.959324100	(0.688; 0.960)
2008	0.663611780	1.005900416	(0.664; 1.006)

Source: Author's own calculations

Reminding the equation (24) $\frac{1-t_d}{1-t_g} - 2c_{tr}\frac{\overline{P}}{D} \le \frac{P_{cum} - \overline{P}_{ex}}{D} \le \frac{1-t_d}{1-t_g} + 2c_{tr}\frac{\overline{P}}{D}$ the price drop on the ex-dividend date is expected to be within the non-arbitrage interval. The ex-day price ratio should lie between 0.850 and 0.943 in 2003, between 0.776 and 1.041 in 2004, between 0.467 and 1.190 in 2005, between 0.637 and 1.016 in 2006, between 0.688 and 0.960 in 2007 and between 0.664 and 0.960 in 2008.

Figure 8 Market equilibrium 2003-2008



Source: Author's own compilation

6.5. Ex day price drop

As referred in the chapter 5, we used 3 different methods to compute the ex divided price drop: the raw price ratio (RPR), the market adjusted price ratio (MAPR), the ratio adjusted for heteroscedasticity (HAPR). The results presented in the Table 22 show, that the different measures give very similar results.

Table 22 Ex-dividend date price drop

	RPR	MAPR	HAPR
2003	0.8280504	0.8273893	0.8317877
2004	1.3754240	1.3667802	1.3678795
2005	0.9612206	0.9607745	0.9609983
2006	1.0651352	1.0670192	1.0690315
2007	0.9619403	0.9611191	0.9620125
2008	0.9129665	0.9164100	0.9244232

Source: Author's own calculations

In contrast with our ex-ante expectations, the price ratios do not belong to the non-arbitrage interval in 4 of 6 cases. The values of RPR, MAPR and HAPR are above the equilibrium interval in years 2004, 2006, 2007 and below the equilibrium interval in 2003. Under the pure tax hypothesis the ex-dividend day price drop should be related to tax variables – dividend tax rate and capital gains tax rate. This is not our case. The violation of non arbitrage condition reveals, that some tax induced trading may occur on the French market.

In 2005 and 2008 we don't observe any deviation from the non arbitrage condition. But it does not necessarily mean, that no tax motivated trading is happening in France. As underlined by Michaely and Vila (1995), if only intra group trading takes place on the on the stock market, *"there are no gains from trade; consequently no excess volume will be observed on the ex-dividend day."* For further results the volume has to be incorporated into the analysis.

6.6. Results for abnormal volume estimation

The abnormal volumes reported in the Table 23 and 24 are calculated in line with Dyl's model. The event window [-10;10] is a standard window used in the ex-dividend day studies (Felixson and Liljeblom, 2004, Rantapuska, 2005, Sander, 2007). The results

confirm, the volumes several days around the ex-date are significantly higher compared to the "normal" trading volume during the rest of the year. The excess trading volume on ex-dividend day ranges from 9.74% to 58.04%. And on several days, mainly before the ex-dividend date, is even much higher, amounting to more than 80% in 2004.

Table 23 Abnormal volumes

	2008	2007	2006	2005	2004	2003
+10	-4.66%	-5.96%	0.17%	-4.75%	19.87%	-4.18%
+9	1.49%	-1.10%	15.33%	-4.00%	-6.00%	36.92%
+8	11.60%	-0.65%	24.54%	-14.72%	10.28%	7.04%
+7	-2.79%	-2.18%	7.99%	-14.50%	18.18%	20.76%
+6	-9.46%	-1.03%	-0.08%	-17.18%	8.29%	25.66%
+5	-5.58%	12.76%	2.26%	-4.32%	0.20%	75.67%
+4	-8.30%	-7.90%	14.51%	-15.29%	-7.47%	38.23%
+3	-5.10%	0.97%	7.36%	4.79%	30.48%	36.83%
+2	-1.12%	4.94%	23.37%	-3.35%	16.13%	18.46%
+1	-0.61%	0.94%	2.36%	-1.87%	83.14%	-0.15%
EX-DATE	**9.74%**	**26.64%**	**13.24%**	**17.14%**	**58.04%**	**25.80%**
-1	12.52%	2.15%	3.76%	28.66%	88.96%	61.57%
-2	2.99%	-12.95%	25.82%	31.64%	99.31%	60.57%
-3	-1.37%	-3.19%	20.70%	70.35%	63.30%	54.30%
-4	4.43%	-1.47%	54.30%	41.62%	31.21%	23.13%
-5	3.18%	1.31%	21.63%	2.79%	42.93%	51.00%
-6	-8.81%	3.10%	-2.34%	3.91%	19.86%	-0.45%
-7	7.93%	7.31%	3.37%	8.93%	26.29%	14.07%
-8	-4.48%	14.56%	3.22%	-1.78%	38.86%	1.44%
-9	-0.58%	8.24%	9.72%	-15.69%	-5.28%	26.31%
-10	-1.34%	-5.47%	-6.64%	-14.18%	-2.47%	22.95%

Source: Author's own calculations

Table 24 Cumulative abnormal volumes (CAV) within event window [-10;10]

	2008	2007	2006	2005	2004	2003
CAV	-0.34%	41.00%	244.57%	98.21%	634.12%	595.93%
	p-value > 0.05	p-value > 0.05	p-value < 0.001	p-value > 0.05	p-value < 0.001	p-value < 0.001

Source: Author's own calculations

Let's remind our hypotheses stated in the previous chapters:

Hypothesis 1: *The abnormal volumes are the most pronounced in 2004, the year before the abolition of "avoir fiscal".*

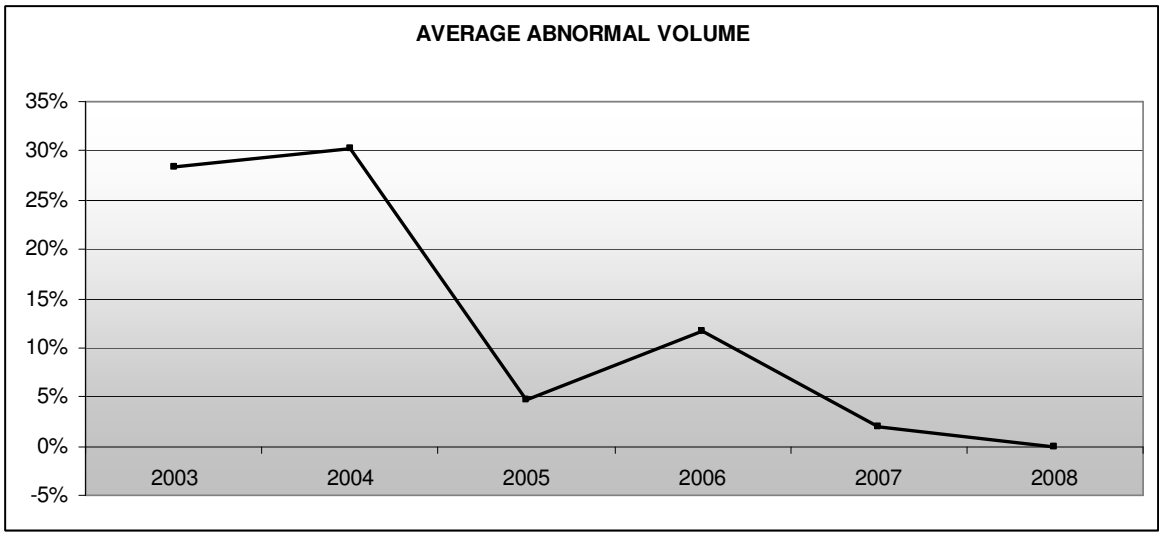
Hypothesis 2: *The abnormal volumes are the lowest in 2008, due to the equilibration of capital gains and dividend taxation.*

Hypothesis 3: *The price drop outside the no arbitrage boundaries is accompanied with a significantly high abnormal volume.*

According to the French tax law the dividends distributed to the resident investors carried the so called “avoir fiscal”, that is the domestic shareholders were entitled to obtain a credit on dividend tax payment. The only investor categories to which the “avoir fiscal” was not applicable, were the tax-exempt entities and foreigners were entitled to receive the tax credit in a very limited amount. The existence of tax credit created opportunities for the tax-arbitrage, especially for the cross-border arbitrage as the non-taxed shareholders were indifferent between capital gains and dividends. In 2005 the imputation system was abolished. But already in 2004 the dividends distributed to non-resident investors were free of imputation credit. Another important tax reform took place in 2008, when the Prélèvement Forfaitaire Libératoire was introduced (PFL). The PFL meant the equilibration of capital gains and dividend taxation. Therefore the profits from the tax arbitrage were extremely reduced.

The measurement of the cumulative abnormal volumes indicated in the Table 24 support both hypotheses 1 and 2. In 2004 the cumulative abnormal volume reached an enormous value of 634.12% within the event window. In other words the traded volumes were in the ex-dividend period on average 30.2% higher than usually (Figure 9). Very similar results were recorded for the year 2003 with cumulative abnormal volume at a level of 595.93%. Such a huge trading volume was obtained due to diverse reasons – the sample of securities with very high liquidity, low risk, low transaction costs and existence of imputation credit. After the tax reform the excessive trading volumes decreased significantly. In line with our expectations, the lowest, even negative volume was estimated for the year 2008, with cumulative abnormal volume equal to -0.34%.

Figure 9 Average abnormal volume around the ex-dividend date (2003-2008)



Source: Author's own calculations

Reminding the results from the previous subchapters, the non-arbitrage conditions are not held in 4 of 6 cases, namely in the years 2003, 2004, 2006, 2007. Combining these results with the ones showed in the Table 24, the hypothesis 3 cannot be rejected on 3 of 4 cases. The trading volumes are significantly greater in 2003, 2004 and 2006.

The violation of non-arbitrage boundaries together with the significant abnormal volume during the ex-dividend period indicates that some tax-motivated trading is taking place on the French stock market. The changes of fiscal law accompanied with the changes in investor's trading pattern around the ex-date, just confirm our previously stated result. The tax system in France, with its discriminatory aspects, creates a profitable arbitrage opportunities which are used by investors mainly in the years 2003 and 2004. During this period the shareholders are pursuing dividend capture activities in order to profit indirectly from the imputation credit. Contrary in 2008, with equalization of dividend and capital gains taxation, the tax-arbitrage opportunities seem to be of low investor's interest.

Table 25 Summarized results for hypotheses testing

Hypothesis	Description	Rejected	Literature
H_1	*The abnormal volumes are the most pronounced in 2004, the year before the abolition of "avoir fiscal".*	NOT	McDonald, 2001 (Germany), Dai and Rydqvist, 2000 (Norway), Bolster et al., 1989 (US)
H_2	*The abnormal volumes are the lowest in 2008, due to the equilibration of capital gains and dividend taxation*	NOT	McDonald, 2001 (Germany), Lasfer, 1995 (U.K.), Dhaliwal and Li, 2006(US), Michaely and Vila, 1995 (US), Bolster et al., 1989 (US)
H_3	*The price drop outside the no arbitrage boundaries is accompanied with a significantly high abnormal volume*	NOT	Liljeblom et al. 2001 (Finland), Sander 2007 (Estonia), Michaely and Murgia (Italy), Dasilas, 2007 (Greece)

Source: Author's own compilation

7. Conclusion

The French tax system treats the taxation of dividends and capital gains in a different manner for different group of investors, therefore it creates tax heterogeneity among investors and sources of income. This research reports on the consequences of differential tax treatment for various shareholder categories on the French stock market, NYSE Euronext.

On the French market one may identify four investor classes: individuals, legal entities, tax-exempt entities and non-residents. Each category is taxed in a different way on capital gains and dividends. The differences in taxation are the most pronounced in 2003 and 2004. During this period the French dividends carried an "avoir fiscal", which made a dividend worth 50%, (10%) more to a taxable French individual resident (a taxable French legal entity) than to the foreign stockholder or to the tax-exempt entity. Hence the pre-tax value of EUR 1 for foreign investor had a pre-tax value of EUR 1.5 to French investor. The tax heterogeneity among traders has created an opportunity for tax-motivated trading during the ex-dividend period.

Our results show, the price drop on ex-dividend date does not lie within the non arbitrage interval, despite our ex-ante expectations. The analysis of trading volumes confirm that trading is highly concentrated in the ex-dividend period, which may be associated with dividend induced trading. In other words, the violation of non-arbitrage boundaries together with significant abnormal volume during the ex-dividend period indicates that some tax-motivated trading is taking place on the French stock market.

The changes of fiscal law accompanied with the changes in investor's trading pattern around the ex-date just confirm our previously stated result. The highest abnormal volumes were recorded in years 2003 and 2004, when the investors were heterogeneous not only with respect to tax rates, but as well with respect to the pre-tax value of dividend income. On the other hand, the lowest trading volumes were measured in 2008 due to equilibration of capital gains and dividend taxation.

Our results are in line with other ex-dividend day studies, like Mc Donald (2001), Liljeblom et al. (2001), Sander (2007) etc., bringing evidence of tax induced trading around the ex-dividend date. However none of the researchers investigated the trading behavior on the French stock market. From this aspect this thesis is a "first" step in this direction. Natural extension of this research would be the broader analysis using a bigger data sample. Our research included the securities with very high liquidity and low transaction costs, which are of high interest to investors wishing to use tax arbitrage strategies. Moreover, we assume the tax arbitrage on the French stock market is mainly related to cross-border tax arbitrage, in which non-resident investors of French shares transfer the dividend to resident shareholders. Consequently we suggest study the trading activity for different stock classes, split according to the degree of foreign ownership. Based on the results of research up to date, we expect the abnormal volumes are the most accentuated for companies with a high degree of foreign ownership and vice versa.

8. Literature

Aharony, J., Swary, I. *Quarterly Dividend And Earnings Announcements and Stockholders' Returns: An Empirical Analysis*, Journal of Finance, 35, 1980

Albouy, M., Dumontier, P. *La politique de dividends des entrerprises*, Presse Universitaires de France, Paris, 1992

Allen, F., Michaely, R. Payout Policy, Wharton Working Paper 01–21-B, 2002 (http://accounting.wharton.upenn.edu/Spring2006/acct920/class%209%20allen%20&%20michaely%202002.pdf)

Bali, R., Hite, G., L. *Ex-Dividend Day Stock Price Behavior: Discreteness or Tax-Induced Clienteles*, Journal of Financial Economics, 1998

Baker, H., K., Kolb, R., W. *Dividends and Dividend Policy*, John Wiley & Sons, New Jersey, 2009

Ball, R., Brown, P. *An Empirical Evaluation of Accounting Income Numbers,* Journal of Accounting Research, 1968

Bamber, S., L. *The Information Content of Annual Earnings Releases: A Trading Volume Approach*, Journal of Accounting Research 24, 1986

Bamber, S., L. *On the Relationship between Quarterly Earnings' Surprises' and Trading Volume,* University of Florida Working Paper, 1985

Beaver, W., H. *The Information Content of Annual Earnings Announcements*, Empirical Research in Accounting: Selected Studies, 1968, Supplements to Volume 7 of the Journal of Accounting Research, 1968

Beblo, M., Beninger, D., Lasiney, F., *Family Tax Splitting: A Microsimulation of its Potential Labour Supply and Intra-household Welfare Effects*, ZEW Discussion Paper No. 03-32, 2003

Bell, L., Jenkinson, T. *New evidence of the impact of dividend taxation and on the identity of the marginal investor*, Journal of Finance 57, 2002

Bernardi, L., Profeta, P. *Tax systems and tax reforms in Europe*, Routledge New York, 2004

Black, F. *The Dividend Puzzle*, Journal of Portfolio Management, 1976

Black, F., Scholes, M. *The Effects of Dividend Yield and Dividend Policy on Common Stock Prices and Returns*, Journal of Financial Economics 1, 1974

Bolster, P., J., Lawrence, L., B., Mitrusi, A., W. *Tax Induced Trading: The Effect of the 1986 Tax Reform Act on Stock Market Activity*, Journal of Finance, june 1989

Bremer, M., Kato, K. *Trading Volume for Winners and Losers on the Tokyo Stock Exchange,* Journal of Financial and Quantitative Analysis, 1996

Brennan, M., J. Taxes, *Market Valuation and Financial Policy*, National Tax Journal 23, 1970

Bhattacharya, S. *Imperfect information, dividend policy and the bird in the hand fallacy*, Bell Journal of Economics 10, 1979

Blazic, H., Basagic, D. *Dividend Taxation: The Comparative Analysis with Emphasis on Slovenia and Croatia*, 2005

Blume, E., M., Crockett, J., Friend, I. *Stock Ownership in the United States: Characteristics and Trends*, Survey of Current Business, 1974

Bolster, P., J., Janjigian, V. *Dividend Policy and Valuation Effects of the Tax Reform Act of 1986*, National Tax Journal 44, 1991

Bolster, P., J., Lawrence, L., B., Mitrusi, A., W. *Tax Induced Trading: The Effect of the 1986 Tax Reform Act on Stock Market Activity* , Journal of Finance, june 1989

Bond, S., Chennells, L., *Corporate income taxes and investment: A comparative study*, The Institute of Fiscal Studies, London, 2000

Boyd, J., H., Jagannathan, R. *Ex-dividend price behavior of common stocks*, Review of Financial Studies 7, 1994

Brav, A., Graham, J.R., Harvey, C.R., Michaely, R. *Payout policy in the 21st century*, Journal of Financial Economics, 2004

Brealey, R.,A., Myers, S., C. *Principles of Corporate Finance*, 7th edition, McGraw-Hill, New York, 2003

Brown, S., Warner, J. *Using daily stock return: The case of event studies*, Journal of financial Economics 8, 1985

Campbell, J., A., Beranek, W. *Stock Price Behavior on Ex-Dividend Dates*, Journal of Finance 10, December 1955

Caudy, G., A., Debs, V., Dagorn, N. *L' imposition des dividends de source françaises: Est-il fiscalement plus avantageux de resider en France ou au Luxembourg lorsque l'on perçoit des dividendes français?*, Université de Poitiers working paper, 2009
http://www.iae.univ-poitiers.fr/afc09/PDF/p17.pdf

Chaplinsky, S., Seyhun, H. N. *Dividends and Taxes: Evidence on Tax-Reduction Strategies*, Journal of Business, 1990

Cnossen, S. *What Kind of Corporation Tax?,* Bulletin for International Fiscal Documentation, Amsterdam, Vol. 47, 1993

Charest, G. *Dividend Information, Stock Returns and Market Efficiency* , Journal of Financial Economics, 1978

Dai, Q., Rydqvist, K. *Global Stock Market and Local Tax Policy: The Case of the Norwegian Tax Credit*, Norwegian School of Management, 2000

Dale, Harvey, P. *Corporate Integration and Tax-Exempt Organizations*, New York University working paper, 1990 (http://archive.nyu.edu/fda/bitstream/2451/23365/2/HPD.CorpInt.90.pdf)

Davydoff, D., Gajewski, J.,F., Gresse, C., Grillet-Aubert, L. *Trading Costs Analysis: A Comparison of Euronext Paris and the London Stock Exchange*, L'Observatoire de l'Epargne Européenne working paper, 2002

Dasilas, A. *Ex-Dividend Day Stock Price Anomaly: Evidence from Greece,* University of Macedonia*,* April 30, 2007

Dethier, J., John, C. *The Taxation of Capital Income in Hungary from the Perspective of European Integration*, World Bank Policy Research Working Paper No. 1903, 1998

Dhaliwal, D., Li, O. *Investor tax heterogeneity and ex-dividend day trading volume*, Journal of Finance 61, 2006

Dong, M., Robinson, C., Veld, T., C. *Why individual investors want dividends*, Journal of Corporate Finance, 2005

Dyl, Edward, A. *Capital gains taxation and the year-end stock market behavior*, Journal of Finance 32, 1977

Eades, K., Hess, P., Kim, H., E. *Market Rationality and Dividend Announcements*, Journal of Financial Economics, 1985

Easterbrook, F., H. *Two agency-cost explanations of dividends*, American Economic Review 74, 1984

Elton, E., J., Gruber, M., J. *Marginal Stockholder Tax Rates and the Clientele Effect*, Review of Economics and Statistics, Vol. 52, No. 1, 1970

EurAudit International, *Les impôts en Europe 2007*, Delmas, 15e édition, 2007

Fama, E., F., Babiak, H. *Dividend Policy: An Empirical Analysis*, Journal of the American Statistical Association, 63(324), 1968

Fama, E., French, K. Disappearing dividends: *Changing firm characteristics or lower propensity to pay?*, Journal of Financial Economics 60, 2001

Felixson, K., Liljeblom, E. Evidence on Ex-Dividend Trading by Investor Tax Category, EFMA Basel Meetings Paper, 2004

Frank, M., Jagannathan, R. *Why Do Stock Prices Drop by less than the Value of the Dividend? Evidence from the Country without Taxes*, Journal of Financial Economics 1998

Frankfurter, G., M., Wood, B., G., Wansley, J., W. *Dividend policy, Theory and Practice*, Elsevier Science, 2003

Hu, S., Tsenf, Y. *Who wants to trade around ex-dividend days?,* National Taiwan University Working paper, 2004

Gilbert, N., Parent, A., *Welfare reform: a comparative assessment of the French and U.S. experiences,* Transaction Publishers, New Brunswick, New Jersey 2004

Graham, J., R., Kumar, A. *Do dividend clienteles exist? Evidence on dividend preferences of retail investors*, Journal of Finance, 61, 2006

Gravelle, G. *Corporate tax integration: Issues and options*, Congressional research services report for congress: Washington D.C., 1991

Grullon, G. and Michaely, R. *Dividends, Share Repurchases and the Substitution Hypothesis,* Rice University working paper, 2002

Hoek, M., P. *Tax Harmonization and Competition in the European Union*, eJournal of Tax Research, 2003 (http://www.austlii.edu.au/au/journals/eJTR/2003/2.html)

Jain, P. *Institutional Design and Liquidity on Stock Exchanges*, Research Paper, Kelley School of Business – Indiana University, 2001

Jain, R. *Institutional and individual investor preferences for dividends and share repurchases*, Journal of Economics and Business 59, 2007

Jenter, D. *Lecture of Finance Theory II (15.402),* Sloan-School-of-Management, Spring 2003

John, K., Williams, J. *Dividends, Dilution, and Taxes: A Signaling Equilibrium*, Journal of Finance, Vol. 40, 1985

De Jong, F., Nijman, T., Roell, A. *A comparison of the cost of trading French shares on the Paris Bourse and on SEAQ International*, European Economic Revue, October 1994

Jugurnath, B., Stewart, M., Brooks, R., *Dividend taxation and Corporate investment: A comparative study between the classical system and imputation system of dividend taxation in the United States and Australia*, Econometric Society 2004 Australasian Meetings, 2004

Kai, L., Xinlei, Z. *Asymmetric Information and Dividend Policy*, Financial Management, Winter 2008

Kalay. A. *The Ex-dividend Day Behavior of Stock Prices: A Re-examination of the Clientele Effect*, The Journal of Finance, 1982

Kalay, A., Michaely, R. *Dividends and Taxes: A Re-Examination,* Financial Management (Financial Management Association), Summer 2000

Kari, S., Ylä-Liedenpohja, J., *Classical corporation tax as a global means of tax harmonization*, University of Munich Centre for Economic Studies and the IFO Institute for Economic Research 665, 2002

Karpoff, J., M. *A theory of trading volume*, Journal of Finance 41, 1986

Kesti, J. *The European Tax Handbook*, IBFD Publications,The Netherlands, 2003

Kesti, J. *The European Tax Handbook*, IBFD Publications,The Netherlands, 2004

Kesti, J. *The European Tax Handbook*, IBFD Publications,The Netherlands, 2005

Kesti, J. *The European Tax Handbook*, IBFD Publications,The Netherlands, 2006

Kesti, J. *The European Tax Handbook*, IBFD Publications,The Netherlands, 2007

Kesti, J. *The European Tax Handbook*, IBFD Publications,The Netherlands, 2008

Kinkki, S. *Dividend Puzzle – A Review of Dividend Theories,* The Finnish Journal of Business Economics, 1997

Kovacs, T., Sipos, A., *Capital Income Taxation in Hungary in Relation to European Union*, European Integration Studies, Miskolc, Volume 1. Number 2, 2002

Lakonishok, J., Vermalaen, T. *Tax Reform and the Ex-dividend Day Behavior*, Journal of Finance 38, 1983 "

Lakonishok, J., Vermalaen, T. *Tax Induced Trading around Ex- Dividends Days*, Journal of Financial Economics Vol. 16, No. 3 1986

Lasfer, M., A. *Ex-day price behavior: Tax or short-term trading effects*, Journal of Finance 50(3), 875-897, 1995

Lasfer, M., A., Zenonos, M., *The Tax Impact on the Ex-dividend dates: Evidence from European firms*, Cass Business School working paper, City University, London, 2003

Lee, Y., Liu, Y., Richard, R.Subrahmanyam, A. *Taxes and dividend clientele: Evidence from trading and ownership structure*, Journal of Banking & Finance 30, 2006

Leibfritz, W., O'Brien, P., *The French Tax System: Main Characteristics, Recent Developments and Some Consideration for Reform*, OECD Economics Department Working Papers No. 439, 2005

Lewellen, G., W., Kenneth, L., S., Lease, R., C., Schlarbaum, G., G. Some *Direct Evidence on the Dividend Clientele Phenomenon*, Journal of Finance, 33, 1978

Liljeblom, E., Löflund, A., Hedvall, K. *Foreign and Domestic Investors and Tax Induced Ex-Dividend Day Trading*, Journal of Banking & Finance Vol. 25, 2001

Lintner, J, *Distribution of Incomes of Corporations Among Dividends, Retained Earnings, and Taxes*, American Economic Review, 46, 1956

London Economics report, *European Financial Integration and equity markets*, 2002

Litzenberger, R., Ramaswamy, K. *The Effects of Personal Taxes and Dividends on Capital Asset Prices: Theory and Empirical Evidence*, Journal of Financial Economics 7, 1979

Litzenberger, R., Ramaswamy, K. *Dividends, Short Selling Restrictions, Tax Induced Investor Clientele and Market Equilibrium*, Journal of Finance 35, 1980

Litzenberger, R., Ramaswamy, K. *The Effects of Dividends on Common Stock Prices: Tax Effects or Information Effects?*, Journal of Finance 37, 1982 "

Lumby, S., Jones, C., Chadwick, L. *Investment Appraisal and Financial Decisions*, 6th edition, engage Learning EMEA Higher Education, 1998

Lundstrum, L. *Testing the Dividend Signaling Hypothesis: Conditional event study versus residual analysis*, working paper, North Carolina State University, 2005

Maditinos, D., I., Sevic, Z., Theriou. N., G., Tsinani, A., V. *Individual investors' perceptions towards dividends: the case of Greece*, International Journal of Monetary Economics and Finance, 2007

McDonald, R., L. *Cross-Border Investing with Tax Arbitrage: The Case of German Dividend Tax Credits*, The Review of Financial Studies, 2001

Michaely, R. *Ex-dividend day stock price behavior: The case of 1986 tax reform act*, The Journal of Finance 46, 1991

Michaely, R., Murgia, M. *The effect of tax heterogeneity on prices and volume around the ex-dividend day: Evidence form the Milan Stock Exchange*, Review of Financial Studies 8(2), 369-399, 1995

Michaely, R.,Vila,J.,L. *Investors' heterogeneity, prices, and volume around the ex-dividend day,* Journal of Financial and Quantitative Analysis 30, 1995

Miller, M., Modigliani, F. *Dividend Policy, Growth and the Valuation of Shares*, Journal of Business, 34, 1961

Miller, M., Rock, K. *Dividend policy under asymmetric information*, The Journal of Finance 40, 1985

Miller, M., Scholes, M. *Dividend and Taxes*, Journal of Financial Economics 1978

Miller, M., Scholes, M. *Dividends and Taxes: Empirical Evidence*, Journal of Political Economy 90, 1982

Milonas, T., N., Travlos, G., N. *The ex-dividend day stock price behaviour in the Athens stock market*, Working Paper, 2001

Monaco, C., *L'imposta sulle società nell'ordinamento francese*, University of Pavia, Department of Economia Pubblica e Territoriale, 1999

Morse, D. *Wall Street Journal Announcements and the Securities Markets*, Financial Analysis Journal 38, 1982

Muller, J., *The Netherlands in international tax planning*, IBFD, 2007

Papaioannou, G., J., Savarese, C., M. *Corporate Dividend Policy Response to the Tax Reform Act of 1986*, Financial Management 23, 1994

Peterson, P., Peterson, D., Ang, J. *Direct Evidence on the Marginal Rate of Taxation on Dividend Income*, Journal of Financial Economics 1985

Pettit, R. *Taxes, Transactions Costs, and the Clientele Effect of Dividends*, Journal of Financial Economics, 1977

Pfleiderer, P., C. *The Volume of Trade and the Variability of Prices: A Framework for Analysis in Noisy Rational Expectations Equilibria*, Stanford University Working Paper, 1984

Rantapuska, E. Ex-dividend day trading: who, how, and why?, Helsinki School of Economics Working paper, 2005

Readett, Jr., P., B. *The Price Behavior of Stocks on Their Ex-Dividend Dates*, S.M. Thesis, MIT, 1956

Ross, S., A., Westerfield, R., W., Jaffe, J. *Corporate Finance*, Irwin McGraw-Hill, 1999

Sander, P. *Tax heterogeneity and trading volume around the ex-dividend day: Estonian evidence*, University of Tartu – Faculty of Economics and Business Administration Working Paper Series, 2007

Scabrosetti, S., *Tax system and reforms in Europe: France*, Societa italiana di economia pubblica WORKING PAPERS No. 186/2002, Pavia 2002

Scholes, M., S., Wolfson, M., A. *Taxes and Business Strategy: A Planning Approach*, Prentice-Hall Inc. 1992, 616 p.

Seida, J., A. *Evidence of tax-clientele-related trading following dividend increases*, Journal of the American Taxation Association, 2002

Shefrin, H., M., Statman, M. *Explaining investor preference for cash dividends*, Journal of Financial Economics 13, 1984

Siroky, J., *Daně v Evropské unii*, Praha: Linde, 2006

Stiglitz, Joseph, E. *Some Aspects of the Taxation of Capital Gains*, Journal of Public Economics Vol. 21, No. 2, 1983

Strickland, D. *Determinants of institutional ownership: Implications for dividend clienteles*, Working paper, Ohio State University, 1997

Varian, H., R. *Differences on Opinion and the Volume of Trade*, University of Michigan Working Paper, 1985

Vassilis A., E. *The timing of tax induced trading around the ex dividend day in the Greek stock market*, Athens University of Economics and Business Greece working paper, 2009

Viitala, T. *Taxation of investment funds in the European Union*, International Bureau of Fiscal Documentation, 2005

Wouters, J. *Les dividendes, la fiscalité et le comportements opportunistes*, Cahiers Financiers, Lacier, 2003

INTERNET

Code général des impôts
http://legifrance.gouv.fr/affichCode.do?cidTexte=LEGITEXT000006069577&dateTexte=20090919

Deloitte http://www.deloitte.com/dtt/cda/doc/content/dtt_tax_highlight_france.pdf

Gilder et al., *Understanding Taxation Law - An Interactive Approach*, 2nd edition, http://www.lexisnexis.com.au/aus/academic/text_updater/gilders/

KMPG France Taxation, Funds and Fund Management 2009
http://www.kpmg.com/SiteCollectionDocuments/Fund_Management/France_Funds_Mtg_taxation_2009.pdf

La fiscalité françaises 2008
http://www.impots.gouv.fr/portal/deploiement/p1/fichedescriptive_3391/fichedescriptive_3391.pdf

European Commission http://ec.europa.eu/

OECD http://www.oecd.org/

Ruding, O. et al. *Conclusions and Recommendations of the Committee of Independet Experts on Company Taxation*, Commission of the European Communities, 1992
http://aei.pitt.edu/1332/01/ruding_tax_report.pdf

Sénat français http://www.senat.fr/

Site de l´administration fiscale http://www.impots.gouv.fr/

Institut national de la statistique et des études économiques (INSEE) http://www.insee.fr/

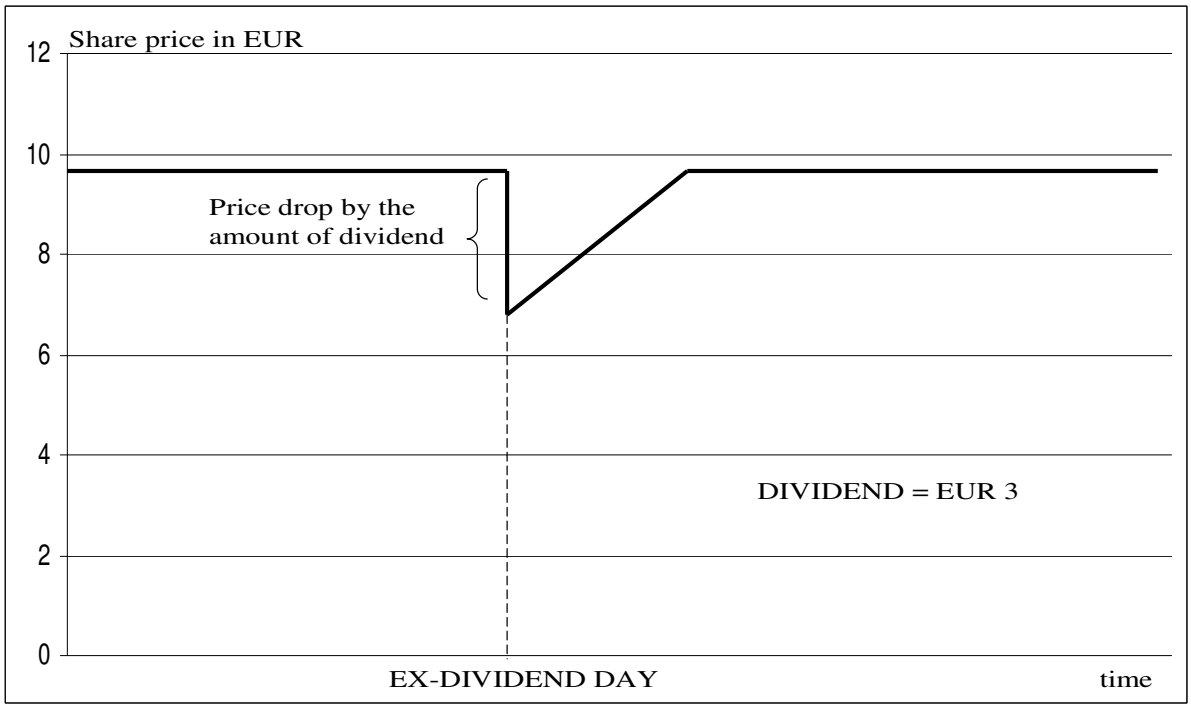
Appendices

Tax arbitrage around the ex-dividend date

Assume an investor buying his stock on the cum-dividend date and selling it back on the day of ex-dividend. From de definition of ex-date, we can conclude the investor receives the dividend, but he suffers from capital loss, as the stock price is expected to drop. The second investor employing an inverse strategy sells his shares on the cum-dividend day and repurchases them the next day. Thus he realizes a capital gain, but he is not entitled to the dividend.

In theory the price of the share on the ex-date should drop by the amount of dividend In the world of perfect capital markets the above-mentioned scenarios are equal; the first investor receives the dividend payment and the second one realize a capital gain equivalent to the dividend amount. But the world is not perfect and one of the main reasons is taxation. In the presence of taxation an investor prefers the dividend payments if the after-tax income is higher compared to the after-tax profit arising from capital gain

Figure 10 Ex-dividend price drop



Source: Author's own compilation

Table 26 Equities - Double Taxation Treaties concluded by France and currently in force

Country	Rate prescribed by the DTT - Dividends (%)	Tax refund available (%)
The standard rate of withholding tax on dividends is 25% before any refund.		
Albania	15	10
Algeria	15	10
Argentina	15	10
Armenia	15	10
Australia	15	10
Austria	15	10
Azerbaijan	10	15
Bahrain	0	25
Bangladesh	15	10
Belarus	15	10
Belgium	15	10
Benin	25	0
Bolivia	15	10
Bosnia-Herzegovina	15	10
Botswana	12	13
Brazil	15	10
Bulgaria	15	10
Burkina Faso	25	0
Cameroon	15	10
Canada	15	10
Central African Republic	25	0
Chile	15	10
China	10	15
Congo	20	5
Croatia	15	10
Cyprus	15	10
Czech Republic	10	15
Ecuador	15	10
Egypt	0	25
Estonia	15	10
Ethiopia	10	15
Finland	0	25
French Polynesia	25	0
Gabon	25	0
Georgia	15	10
Germany	15	10
Ghana	15	10
Greece	25	0
Guinea	15	10
Hungary	15	10
Iceland	15	10
India	10	15

Indonesia	15	10
Iran	20	5
Ireland	15	10
Israel	15	10
Italy	15	10
Ivory Coast (Côte d'Ivoire)	15	10
Jamaica	15	10
Japan	10	15
Jordan	15	10
Kazakhstan	15	10
Korea, Republic of	15	10
Kuwait	10	15
Kyrgyzstan	15	10
Latvia	15	10
Lebanon	0	25
Libya	10	15
Lithuania	15	10
Luxembourg	15	10
Macedonia	15	10
Madagascar	25	0
Malawi	25	0
Malaysia	15	10
Mali	25	0
Malta	15	10
Mauritania	25	0
Mauritius	15	10
Mayotte [f]	25	0
Mexico	15	10
Moldova	15	10
Monaco	25	0
Mongolia	15	10
Montenegro	15	10
Morocco	0	25
Namibia	15	10
Netherlands	15	10
New Caledonia	15	10
New Zealand	15	10
Niger	25	0
Nigeria	15	10
Norway	15	10
Oman	0	25
Pakistan	15	10
Philippines	15	10
Poland	15	10
Portugal	15	10
Qatar	0	25
Romania	10	15

Russia	15	10
St. Pierre and Miquelon	5	20
Saudi Arabia	0	25
Senegal	15	10
Serbia	15	10
Singapore	15	10
Slovak Republic	10	15
Slovenia	15	10
South Africa	15	10
Spain	15	10
Sri Lanka	25	0
Sweden	15	10
Switzerland	15	10
Tajikistan	15	10
Thailand	25	0
Togo	25	0
Trinidad and Tobago	15	10
Tunisia	25	0
Turkey	20	5
Turkmenistan	15	10
Ukraine	15	10
United Arab Emirates	0	25
United Kingdom	15	10
United States of America	15	10
Uzbekistan	10	15
Venezuela	15	10
Vietnam	15	10
Zambia	25	0
Zimbabwe	15	10

Source: Clearstream (www.clearstream.com)

Table 27 Empirical studies on ex-days around the world

Study	Examined Period	Examined Market	Finding
1 Campbell and Beranek (1955)	1949-1950	USA	NP/D<1
2 Durand and May (1969)	1948-1959	USA	NP/D<1
3 Elton and Gruber (1970)	1966-1967	USA	Tax effect
4 Litzenberger and Ramaswamy (1979)	1936-1977	USA	Tax effect
5 Kalay (1982)	1966-1967	USA	Short term trading
6 Poterba and Summers (1984)	1955-1981	UK	Tax effect
7 Booth and Johnston (1984)	1970-1980	Canada	Tax effect
8 Lakonishok and Vermaelen (1986)	1970-1981	Canada	Short term trading
9 Barclay (1987)	1962-1985	USA	Tax effect
10 Grammatikos (1989)	1975-1985	USA	Short term trading
11 Hietala (1990)	1974-1985	Finland	Tax effect
12 Michaely (1991)	1986-1989	USA	Short term trading
13 Stickel (1991)	1972-1980	USA	Tax effect
14 Lamdin and Hiemstra (1993)	1982-1991	USA	Tax effect
16 Hearth and Rimbley (1993)	1984-1988	USA	Short term trading
17 Boyd and Jagannathan (1994)	1962-1987	USA	Short term trading
18 Michaely and Murgia (1995)	1981-1990	Italy	Tax effect
19 Lasfer (1995)	1985-1994	UK	Tax effect
20 Kato and Lowenstein (1995)	1981-1991	Japan	Tax effect
21 Bowers and Fehrs (1995)	1976-1987	USA	Short term trading
22 Wu and Hsu (1996)	1984-1990	USA	Tax effect
23 Michaely and Vila (1996)	1963-1991	USA	Tax effect
24 Siddiqi (1997)	1987-1988	USA	Short term trading
25 Espita and Ruiz (1997)	1980-1992	Spain	Tax effect
26 Bali and Hite (1998)	1962-1994	USA	Tick size effect
27 Frank and Jagannathan (1998)	1980-1993	Hong Kong	Bid-ask spread effect
28 Bhardwaj and Brooks (1999)	1986-1989	USA	Tax effect
29 Naranjo, Nimaledran and Ryngaert (2000)	1962-1994	USA	Short term trading
30 Liljeblom, Loflund and Hedvall (2001)	1994-1996	Finland	Tax effect
31 McDonald (2001)	1989-1998	Germany	Tax effect
32 Bell and Jenkinson (2002)	1995-1999	UK	Tax effect
33 Lasfer and Zenonos (2003)	1988-2002	UK, Italy, France,Germany	Tax effect
34 Graham, Michaely and Roberts (2003)	1996-2001	USA	Tax effect
35 Jakob and Ma (2004)	1993-2001	USA	Limit order imbalance
36 Milonas, Travlos, Xiao and Tan (2006)	1996-1998	China	Tax effect
37 Farinha and Soro (2006)	1993-2002	Portugal	Tax effect
38 Castillo and Jakob (2006)	1989-2004	Chile	Short term trading
39 Jakob and Ma (2006)	1962-1994	USA	Limit order imbalance
40 Daunfeldt, Salender and Wikstrom (2006)	1991-1995	Sweden	Tax effect
41 Yahyaee, Pham and Walter (2007)	1997-2005	Oman	Bid-ask spread effect
42 Sander	2000-2006	Estonia	Tax effect

Source: Dasilas (2007)