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The effects of Joint Ventures announcements on stock returns behaviour

An Event Study of the Stock Market

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Abstract

Title: The effects of Joint Ventures Announcements on Stock Returns Behaviour - an Event Study of the Stock Market

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Key words: Joint Venture, Market Efficiency, Event Study, Abnormal Return, Market Model

Purpose: The purpose of this paper is to examine the reactions of stocks of companies which announce joint venture formation.

Methodology: In our paper we employed the study the standard event study approach, examining 84 companies which have announced Joint Venture and are listed in Frankfurt stock exchange.

The purpose of this study is to examine the effects of joint venture announcements on stock prices behavior and simultaneously to test the German stock market (Frankfurter Wertpapierbörse) for efficiency. We tried not only to analyze the general impacts of a JV-announcement but also to look for differences in the market response to announcements of different types of joint ventures, namely: domestic, international, horizontal and vertical. Our expectations of efficient market were confirmed during our paper, which employed the technique of the standard event study. The calculation of abnormal returns which are the signals for market efficiency or inefficiency respectively were based on the market model, establishing linear relationship between the return on the market and the return on an individual security. The parameters of the model were obtained through regression analysis.

1 INTRODUCTION	4
1.1 BACKGROUND.....	4
1.2 PROBLEM FORMULATION.....	5
1.3 PURPOSE.....	6
1.4 TARGET GROUP	6
1.5 LIMITATION	6
1.6 OUTLINE	6
2. THEORETICAL FRAMEWORK	7
2.1 JOINT VENTURE THEORY	7
2.1.1. Literature Overview-rationales for Joint Venture Formation	7
2.1.2 Empirical results: the effects of JV-s (literature overview).....	8
2.2 MARKET EFFICIENCY?.....	9
3. METHOD DESCRIPTION AND DATA.....	12
3.1 METHODOLOGY	12
3.1.1 Data collection and selection criteria.....	12
3.1.1.1 The companies	13
3.1.1.2. The stock market.....	13
3.1.2 Zero-day identification	13
3.1.3 The event window	13
3.1.4 The Normal returns construction.....	14
3.1.5 The estimation window	15
3.1.6 α and β -calculation	16
3.1.7. The Abnormal Return.....	16
3.1.8. Test procedure	16
3.1.8.1. T-test.....	16
3.1.8.2. Non-parametric tests	18
4. EMPIRICAL RESULTS.....	19
4.1 GENERAL RESULTS	19
4.2 ANNOUNCEMENT-EFFECTS ON DOMESTIC JOINT VENTURES	22
4.3 INTERNATIONAL	23
4.3 HORIZONTAL JV	25
4.5. VERTICAL	26
5. SUMMARY	27
5.1 CONCLUSIONS	27
5.2 FURTHER RESEARCH.....	30
REFERENCE LIST	31

1 Introduction

This part introduces the subject of interest of our thesis and provides details about our choice. We also formulate the question this paper aims to shed light on. In a final step we describe the target group and the limitation of the research.

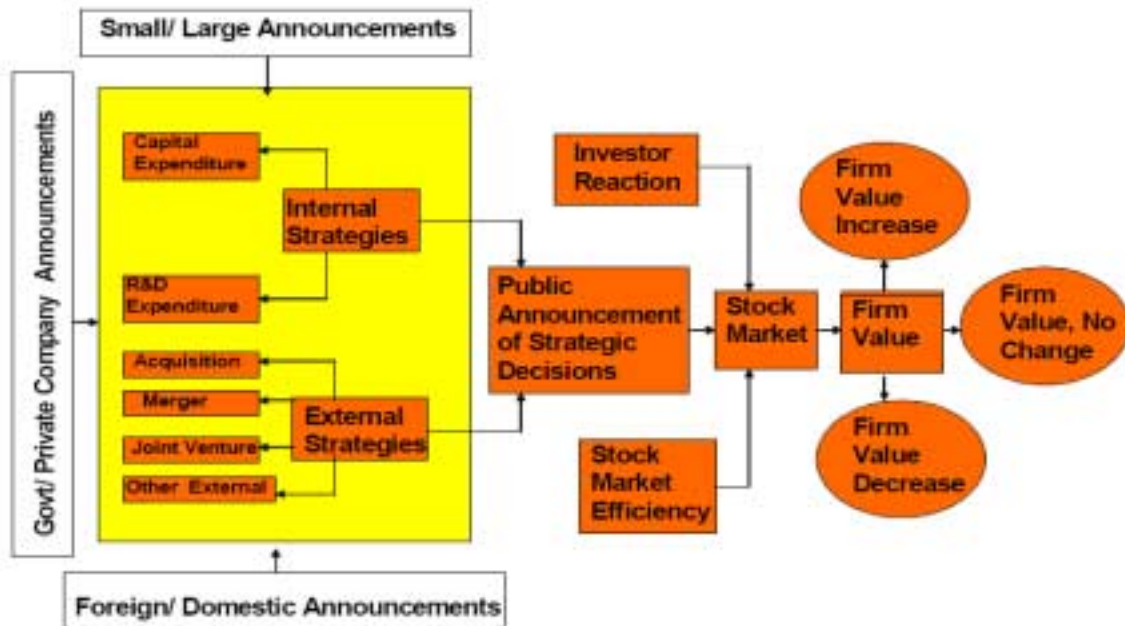
1.1 Background

Almost every day information about new joint ventures (JV) is released and there is hardly any big and successful company without one or even more Joint Venture experiences. This kind of strategic decision is simultaneously a stringent necessity and phenomenon nowadays and therefore deserves accordant attention.

In the technology, information and globalization-ruled era many companies are striving to survive, enter new markets or have access to specific knowledge. Increased competition leads to the need for joint use of resources and complementary strengths and competences. In order to achieve or sustain competitive advantage, companies have to be innovative and permanently attractive to customers. By entering into joint ventures, companies take advantage of the synergies arising from sharing skills, profits and risk.

According to the definition of Joint Venture in the economic literature, this is a contractual agreement for the formation of an entity by two or more parties in order to undertake economic activity together. The parties create a new entity, by both contributing equity and they then share in revenues, expenses and control of the enterprise. The venture can be for one specific project only or a continuing business relationship. The figure below (Suresh, Vijayaraghavan, *Stock market reaction to corporate strategic decisions*) generalizes the possible outputs of strategic choices and the joint venture as a special case. It is in terms of firm value, which is in close connection to the firm's stocks performance.

Figure-I: Effect of Public Announcement of Corporate Strategic Decisions on Firm Value



1.2 Problem Formulation

The major tools of research of this paper are stock prices, which are the immediate reflection of the earning capacity of the company and investors' expectations of investment performance. The stock market is the place, where information materializes-namely in the behavior of stock prices. The answer of the question to which extend information is captured by prices is not an easy one. The theories in this field are contradictory. On the one hand we have the Efficient Market Hypothesis (EMH) that has been consented as one of the cornerstones of modern financial economics. Professor Eugene Fama, who was the first to formulate the efficient market concept in the financial literature in the 1960s, suggests that at any given time all the information available on the market has to be reflected by stock prices. This hypothesis implies that stock prices are non-predictable but rather follow a random walk. The random walk of stock prices results in the inability of any investment strategy to outperform the market.

On the other hand we have to be critical and look for possible weaknesses of this hypothesis so that we are closer to the reality. Indeed, there are a number of evidences, violating the efficient market concept validity.

In this connection our thesis can be considered as an attempt to test the market efficiency concept once again, in our case in the context of joint venture announcements. As we stated above, joint ventures are more or less obligatory part of any company's corporate policy and a

typical characteristic of today's 'business doing'. Unfortunately the empirical studies on the effects of this phenomenon have provided ambivalent results, which raises the need for further careful study of companies experiencing the consequences' of this strategic decision. With this thesis we aim at contributing to the knowledge accumulated about joint ventures and their effects on stock returns in particular. Unlike many of the papers dedicated to the problem, which focus on too narrowly defined (in our opinion) joint venture cases(e.g. only domestic or horizontal joint ventures) we would like to shed light on the overall joint ventures impacts, examining different modes of JV, industries and countries of origin simultaneously.

1.3 Purpose

The purpose of this paper is to examine the reactions of stocks of companies which announce joint venture formation and to test for efficiency the German stocks market. We are interested in a comparison between the overall effect of joint venture announcements and the results, arising from a detailed analysis, focusing on specific types of joint ventures.

1.4 Target Group

With this thesis we take an accurate aim at the people interested in strategic decisions/joint ventures issues as well as in stock prices behavior problems: Our paper is also directed at everyone, concerned with the theories, supporting or rejecting the Efficient Market Hypothesis. Obviously the reader has to be equipped with knowledge in stocks/stock market characteristics, but we also hope to be able to rouse the interest of the common man.

1.5 Limitation

Our study is based on a sample of 84 joint venture events between 1995 and 2006. The announcements about joint ventures were taken from Reuters and the financial information needed from DataStream. The companies experiencing the effects of joint ventures are all listed on the Frankfurt Stock Exchange and will be described in detail later in this paper

For the purpose of our study we need the framework of the event study methodology, calling for the choice of reasonable event window. We base our study on a time horizon of 20 days prior to and 19 days post event.

1.6 Outline

In chapter 2 we introduce the base our study steps on- joint ventures-, and market efficiency theory. Chapter 3 is focused on the methodology of event studies, the choice and discussion of alternative models as well as the data input. Our results are presented in chapter 4 with tables

and plots of abnormal returns. Chapter 5 is dedicated to the summary, comparisons and conclusions we draw from this work.

2. Theoretical Framework

This chapter provides an insight into the theories underlying the problem of concern of this paper. Since our thesis is the intersection of corporate strategy policy with the information sensitivity of stock prices we need to describe them in details.

2.1 Joint venture theory

A joint venture is a way of accomplishing specific objectives through pooling resources by the partner companies entering the joint venture. The newly formed entity is subject to the common management of the parent companies and doesn't affect their original management but is absolutely independent.

A joint venture can be created by 2 or more companies. In addition ownership can be shared 50-50 or unequally. The first alternative prevails in practice.

Beyond that, joint ventures can be classified as horizontal or vertical (diversifying) when referring to the industry in which the parent company and the new entity operate. Horizontal joint venture is created when the market of the newly created unit is the same as the one of the parent company. Examples are the joint ventures between Hitachi and Panasonic in the consumer electronics area or Mitsubishi and Isuzu in the automotive sector. Vertical joint ventures arise when companies strive for new competences/skills and logically lead to the establishment of an entity in a market, different from the one of the parent company.

Further one can distinguish between international and domestic joint ventures or such between small and large companies.

John Child (*Contemporary Principles and Practice*) explains that JV has grown significantly as an organizational form since the 1980s. Further, he briefly reveals the major reasons behind joint ventures. They are preferred when companies enter risky but emerging markets. A second reason for JV is to fulfill specific requirements of local governments. Today's JV is regarded as to achieve fundamental strategy, such as to widen market position, to achieve knowledge acquisition and cost reduction.

2.1.1. Literature Overview-rationales for Joint Venture Formation

There are many studies on the reasons driving firms to form joint venture. According to McConnell and Nantell (1985) joint venture are source for "synergistic gains" arising from

the sharing of complementary skills and resources. These are for example: sharing of risk to manage demand uncertainty, reallocation of resources for more profitable purposes, gaining economies of scale and scope, enhanced marketing and logistics techniques.

Brodely (1982) sees the reasons differently-resulting mostly from cost savings considerations. In the literature exist also other views on the advantage potential of joint ventures. Hennart (1991) for example explains that considerable benefits can be extracted from this strategic decision when the parent company uses it for purposes of its diversification strategy-that is when the industry of the parent company is different from the one of the new entity(e.g. Sony Ericsson). In so doing the company obtains access to costly, irreplaceable or patented resources.

Secondly, when it comes to international expansion of business, many firms may lack the knowledge about local conditions. Further, joint ventures can be the only way to enter a foreign market because of discouraging governmental regulations. Therefore, the massive establishment of joint ventures in China must be no surprise, but considered rather as a necessity, having in mind that establishing a joint venture with local companies is the only “entrance” into this huge market.

Hennart (1988) summarizes the rationales for joint venture in another study: 1) joint ventures are reasonable when the market the parent companies operate in, isn't efficient enough in terms of immediate goods(know-how, materials, etc.).2) Joint ventures are advantageous when the right to use resource is more efficient than to acquire it.

2.1.2 Empirical results: the effects of JV-s (literature overview)

Joint ventures seem to be a very beneficial strategic tool and one may expect that their effects on company value are always positive. The literature however provides mixed results.

We present the findings of some past studies. Gleason et al. (2003) examined some companies in the banking, investment services and insurance industries and find significantly positive abnormal returns across the four different modes of expansion: domestic, international, horizontal and diversifying.

Johnson and Houston (1999) find that horizontal domestic joint ventures create synergistic gains that are shared by the partners, whereas vertical ones generate gains only for suppliers. McConnell and Nantell (1985) investigate the common stock returns of U.S. companies that announce joint ventures with other U.S. companies and find that there are significant excess returns around the announcement date. They also find that smaller partners earn larger excess

rate of return. Kwoka (1992) finds support for wealth creation effects of joint ventures when there is no alteration in the competitive behavior of parent firms after the joint venture. He et al (1994) study the wealth effects of domestic versus international joint ventures in the real estate industry. Their results suggest that domestic real estate joint ventures lead to an increase in firms' value while international joint ventures have non-significant or less significant value creation effects.

Negative effects on stocks returns were unfortunately also experienced. Waheed & Marthur (1995) find out that shareholder of their sample companies earn negative abnormal returns on the announcement day. Mohanram & Nanda (1996) came to the same result when they examined US stock markets reaction to domestic JV. Chang and Chen (2002) studied JV by Taiwanese firms and the result was that these domestic JV announcements brought negative result. At the same time, they also find that the announcement effects were positively related to investment opportunities, the size of the investment and debt ratio, and are negatively related to the business-relatedness variable.

2.2 Market Efficiency?

When we talk about stock prices and their information sensitivity we unavoidably face the innumerable theories regarding market (in) efficiency. The efficiency-inefficiency debate has resulted in a plenty of empirical studies trying to test if specific markets are efficient in reality and to which extend. The advocacy for efficient markets presence championed in the Efficient Market Hypothesis developed by Eugene Fama in the 1960s. The concept has actually established itself as the guiding light in the area of finance for the past few decades. Before its introduction, markets were considered rather as inefficient (especially US and UK stock markets). However, professor Fama from Chicago University persuasively argued that in an active market including many well-informed and intelligent investors, securities must be appropriately priced. Fama (1965) :

*“An efficient market is defined as a market where there are large numbers of rational, profit-maximizes actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants. In an efficient market, competition among the many intelligent participants leads to a situation where, at any point in time, **actual prices of individual securities already reflect the effects of information based both on events that have already occurred and on events which, as of now, the market expects to take place in the future.** In other words, in an*

efficient market at any point in time the actual price of a security will be a good estimate of its intrinsic value”

Fama summarizes the sufficient conditions for efficient market existence as follows:

- Availability of costless information
- No transaction costs in securities trade
- Market participants’ agreement on current prices’ implications

Further the degree of market efficiency can vary conditional on the type of information considered. Thus we distinguish between:

Weak market efficiency, based solely on historical price information.

We can represent it mathematically through the following equation (2):

$$P_t = P_{t-1} + \text{Expected Return} + \text{Random Error } t$$

P_{t-1} is the last observed price, which could have occurred yesterday, last week, month etc., depending on the sampling interval. The expected return is a function of the security’s risk and can be based on different models, which we will discuss later. The random component, which will also be explained in the next section of the paper, is unpredictable from previous prices and is the reason why stocks are said to follow a *random walk*.

The existence of the weak form of market efficiency implies that investors are not able to earn excess returns following only historical data. The validity of this version of the hypothesis can be proven through predictions based on historical data about cyclical behavior of prices. If the outcome of this test is the existence of abnormal returns, the weak market efficiency hypothesis must be rejected.

- *Semi-strong market efficiency*, resting on all historical and publicly available information. Share prices adjust within a very short period of time and thus make the trade on particular information and the following excess returns impossible. The soundness of this form can be tested by means of event studies.
- *Strong market efficiency*. This form implies that share prices are reflection of the entire information available. Excess returns can not be extracted because as Fama suggested

nobody can have monopolistic access to information and therefore trading profits. An evidence that this form of market efficiency holds, would be the non-existence of investors being able to outperform the market consistently over a long period of time.

Even though the Efficient Market Hypothesis turned to one of the cornerstones of modern financial theory, it is still heatedly disputed. The predictability of the market has turned to the core of the debate, which provided mixed empirical results.

Burton G. Malkiel (2005) does a study on the returns of actively managed mutual funds (enjoying enormous public confidence and respect) and compares them to benchmark indexes. Thus, for example, he comes to the conclusion that over one-year period three quarters of the mutual funds holding large capitalization stocks were outperformed by the Standard & Poor's 500 index. When the comparison is made over periods of 10 years the percent of outperformed mutual funds is even more than three quarters. But the results for active managers are worst when performance is measured over periods of more than 30 years - from the funds existing 30 years ago only approximately one third survived. Moreover, the "winners" - those which survived - showed too inconsistent results.

Fama (1998) also supports his own hypothesis in newer studies almost 30 years after he introduced the concept first. He argues that large long-term anomalies can not be attributed to chance.

However this so persuasive (at first sight) school of thought has met a lot of opposition. Many theorists and practitioners (e.g. Benjamin Graham, Warren Buffet etc.) can not accept the explanation that one can make profit only by chance and there are consequently no efficient techniques for beating the market.

Thus, even B.G.Malkiel should admit that there are some instances where market prices failed to be efficient and to reflect the information available. One example is the "large scale irrationality, such as the technology-internet bubble of the late 1990s extending into early 2000".

Significant doubt on the soundness of EMH cast Grossman and Stieglitz (1980) - two of the most serious opponents of the Efficient Market Hypothesis. According to them prices can not fully reflect available information, since information is very costly and those, spending

recourses on acquiring it should receive compensation, which automatically leads to the “impossibility” of efficient markets. Further, excess returns should be seen not as abnormal but as compensation for information-gathering.

In addition, critique can also be exercised when we consider the strong form of market efficiency, which claims that all individuals dispose of equal information. Of course that is not the case in practice; where special participants like for example insiders, managers, etc. have significantly more access to specific information.

Some theorists attempted to search for alternatives of the EMH. So the concept of behavioral finance came to light, explaining economic decisions by means of cognitive and emotional biases. The most representative paper in this field can be assigned to Kahneman and Tversky, who published *Prospect Theory* in 1979.

Another alternative to the efficient market concept can be the idea of relative market efficiency, developed by Campbell and calling for efficiency measures, resting on comparisons between markets (NYSE vs. Frankfurt Stock Exchange; futures market vs. spot market).

3. Method description and data

3.1 Methodology

From the title of this paper is obvious that the approach to be followed must be the one of event studies, developed by Fama, Fisher, Jensen and Roll in their study “*The adjustment of stock prices to new information*” The standard event study technique is used when analyzing whether there was any statistically significant reaction in financial markets to past occurrences of a certain type, which are expected to impact firm value. Such occurrences could be firm-wide - the announcements of different corporate decisions (e.g. mergers, acquisitions) or economy-wide-macroeconomic variables announcement (unemployment rates) etc.

The event studies are driven by the logic that any newly released information has to be incorporated immediately in stock prices. Therefore stock price changes turn to the main tool of research in this type of studies.

The event study outline we followed is:

3.1.1 Data collection and selection criteria

Here one has to decide on the type of securities and on the sample to be examined. The underlying securities are logically stock prices, which historical values were collected from

Thomson's DataStream 4.0. We chose a sample of 84 joint venture events in order to go in line with the requirements of statistical significance.

3.1.1.1 The companies

We chose the leaders in the automotive, chemical, consumer electronics, telecommunications, and computer technology industries for two reasons. First these industries are subject to significant dynamics, which we would like to capture in our study. Second these companies are the largest companies in terms of market value, revenue, profit, number of employees and assets. The size is very important in order to ensure that the announcements attract the necessary visibility within the investing community.

Further we tried to examine companies from many different countries of origin and to challenge the large number of studies, dedicated to joint ventures, or stocks, originating from just one or a few countries. However it is to mention that the European and Japanese companies prevail.

3.1.1.2. The stock market

Our market of reference is Frankfurter Wertpapierbörse-Frankfurt Stock Exchange, because we think that its highly international profile is of an advantage for our paper (This is the market, where except of Japan of course, the most Japanese stocks are traded, and exactly these stocks play a significant role in our study).

Further we decided to focus on FSE, because it has very competitive position. Besides, the exchange has managed to offer an attractive framework for foreign investor and market participants. As an index benchmark we picked the leading index of FSE- the DAX, tracking the price development of the 30 largest and most actively traded German equities and launched 1998. It is also used to measure the performance of the companies in terms of order book volume and market capitalization.

3.1.2 Zero-day identification

The day of initial announcement is defined as event date $\tau=0$. The joint venture announcements/dates were taken from Reuters' news releases and originate from the period 1995-2006.

3.1.3 The event window

The event window is the time horizon of the study. We examine the daily stock returns of our sample of companies 20 days prior to the event- the announcement date- and 19 days after it.

Thus, the event window consists of 39 days. We denote the day -20 as T_1 and the 19th day after the event as T_2 . So the length of the event window can be expressed as $L_1 = T_2 - T_1$.

It is important to mention that when examining stock returns we faced the problem of choosing between daily stock returns and monthly observation as well as between a shorter and longer event window period. There is a huge amount of studies challenging the use of short periods by stating that stock prices adjust slowly so that longer periods of examination are needed. However we preferred to use daily expected return observations since they have the advantage of being close to zero, so that the model for expected returns doesn't have big impacts on inferences about abnormal returns.

In this connection we need to mention that the event window of the individual securities included in the study don't overlap in calendar time, which leads to the non-existence of cross-sectional correlation. This has the important implication that we are allowed to calculate the variance of the aggregated sample cumulative abnormal returns in the next section of our study without concerns, referring to co variances between individual CAR-values.

3.1.4 The Normal returns construction

In order to calculate AR we first need to know the expected (normal) return - the return that would have occurred if the event would not have happened. There exist many different approaches to construct it. One group of them is the economic models, like for example the Capital Asset Pricing Model and the variations of the Asset Pricing Model. The CAPM used to be very popular in event studies in the 1970s, but significant weaknesses of its restrictions were discovered, which cast doubt on its validity. The APT on the other hand has been proven not to impose wrong restrictions on mean returns, but makes event studies much more complicated and is of little practical advantage. The alternative to economic models is the statistical models. The multifactor model is an example for a statistical model. Its advantage is its ability to explain more of the variation in the expected return. In addition to the market index it employs industry indexes as well. The explanatory power of additional factors is however so small, that the practical advantages of this model in event studies are also limited. So, the two most reasonable models for normal return construction seem to be the constant mean-return model and the market model, which is actually a one factor model.

The constant mean return-model is specified as:

$$R_{it} = U_{it} + e_{it},$$

where U_{it} it is the expected return on security i at time t , and e_{it} is a stochastic error term with expectation of zero and uncorrelated over time. That represents actually the abnormal return.

Even though it is the simplest model it has been proven by Brown and Warner (1985), that it yields results, close to those of the more advanced models. Despite of that we preferred to use the market model, which with it precision allows the researcher to control for market-wide fluctuations to measure daily market abnormal returns. Further it has the ability to detect significantly more event effects, due to the reduced variance of the abnormal return.

The market model establishes a linear relationship between the return on an individual security and the return on the market (the aggregated portfolio of all securities). The model's linear specification arises from the assumed joint normality of assets returns. The market model can be represented as:

$$R_i = \alpha_i + \beta_i R_m + \varepsilon_i, \text{ where:}$$

- ε_i is the term, expressing unpredictability or the random error with: $E(\varepsilon_i) = 0$, $var(\varepsilon_i) = \sigma_{\varepsilon_i}$
- R_m is the measure for marker return, in our case the DAX,
- R_i the return on security i
- β_i is a constant, measuring the expected change in R_i , given a change in R_m , in other words this is the correlation between the return on the market and on an individual security: $\sigma_{im} / \sigma_m * \sigma_m$, where σ refers to variance/covariance

α_i is a constant term, specific to every single stock

The expected return is then logically: $E(R_i) = \alpha_i + \beta_i E(R_m)$

3.1.5 The estimation window

In order to compute the expected return we need to know the values of the parameters α and β , because they can not be observed directly from historical data. For this purpose we constructed the estimation window-the period over which these parameters are estimated. We chose a period of one year before $T_1 = -20$. So the estimation window has the length

$$L_o = T_1 - T_o,$$

with T_0 = the 'oldest day' of the 1-year observation period

3.1.6 α and β -calculation

The estimation of the parameters α and β is based on the ordinary least square analysis, which leads to the following equation:

$$R_i = X_i * \theta_i + \varepsilon_i, \text{ where:}$$

R_i is a vector of returns, with L_0 elements,

X_i is a matrix with vectors of ones in the first column and vector of R_m observations in the second one, and

θ_i is a vector of parameters with L_0 components

3.1.7. The Abnormal Return

After obtaining the parameters of the market model the expected return on security i during the event window ($t = -20; t = 19$) can be computed. We subtract it from the actual return to obtain the abnormal return:

$$AR = R_i - \alpha_i + \beta_i * R_m$$

3.1.8. Test procedure

In order to interpret reasonably the results of our study a test procedure needs to be introduced. We employed statistical parametric and non-parametric techniques.

3.1.8.1. T-test

We used the standard t-test procedure to test to which extend average abnormal returns and cumulative return-values are significantly different from null.

The Average Abnormal Return is defined as the mean return of the sample of 84 companies, experiencing the effects of joint ventures on day t :

$$AAR_t = \frac{1}{n} \sum_{i=1}^n AAR_i,$$

where n is the number of observations.

To establish if there is any significantly different from 0 abnormal return on every on the days in the event window, we applied the t-test under $H_0: AAR_t = 0$, and the alternative hypothesis $H_1: AAR \neq 0$. The critical value for this two-tailed test is therefore the Student quantile with $n-1$ degrees of freedom (83 in our case). We took into consideration both the 5% and the 1 %

significance levels. To reject the null hypothesis the values of the t-test should be either higher than the critical values or lower than their negative equivalents respectively.

Sometimes equation (3) may not yield significant abnormal returns on a certain day, so that the cumulative effect of an event over a certain time period within the event window could be of interest. For this purpose we need to sum the AAR over a period in the event window we specify. The Cumulative Abnormal Return (CAR) is then logically:

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AAR_i .$$

We calculated this value for a number of time periods around the event day. In order to prove if there is any significant mean cumulative abnormal return for the time periods we specify in the next section, we defined the null hypothesis in the same fashion as for the AAR:

$$H_0: CAR(t_1, t_2) = 0$$

and the alternative hypothesis $H_1 \neq 0$.

In addition we also carried out a paired t-test , to prove if there are any substantial differences in the abnormal returns in the two subsets of the event window-the pre-event window (from day -20 to dy-1) and the post event window (from day 1 to day 19). The t -value was calculated as follows:

$$t = \frac{\bar{d}}{\sqrt{\frac{\text{var}}{N}}}, \text{ where}$$

\bar{d} is the mean difference,

var is the sample variance and

N is the number of observations in the sample.

In order to reject the null hypothesis, stating that there are no significant differences in the mean returns the t-values should arrive at values larger than the ones for t critical with n-1 degrees of freedom and at the confidence level of 5%.

3.1.8.2. Non-parametric tests

Very often in conjunction with parametric tests researchers employ nonparametric tests, which can considerably improve the quality of the results' interpretation. Unlike parametric tests, the non-parametric ones don't impose assumptions regarding the return distribution.

To examine the usefulness of these types of tests, less restrictive of the parametric ones, we applied two non-parametric methods, namely the binominal sign test and the Wilcoxon signed rank test.

First we conducted the binomial sign test, aiming to prove if the proportion of positive/negative returns on a certain day is equal to 0,5 or not. The test value is calculated as follows:

$$B = \frac{(X - PN)}{\sqrt{P(1 - P)N}}$$

where X is the number of positive abnormal returns on a certain day t within the event window, N is the number of observations, and P is the proportion 0,5.

In addition to the binominal sign test we also applied the Wilcoxon signed rank test, introduced by Frank Wilcoxon in his paper from 1945. This type of test not only extracts information from the sign but also from the magnitude of abnormal returns. It is actually the non-parametric alternative to the paired t -test.

Wilcoxon rank signed test is interested in the differences between the values of objects (observations), which are being tested repeatedly. In our case we compare the two subsets of abnormal returns in our event window of 39 days, namely the pre-event window (-19,-1) and the post-event window (1, 19). After obtaining the absolute value of the differences between pre-event AR and post-event AR, we arrived at 19 values, which we ranked with the smallest value getting the highest rank. These ranks were assigned signs, corresponding to the sign of the difference, and then the signed ranks were summed. The value of the sum of these ranks W is to be tested under the null hypothesis. Under this hypothesis we would expect it to approximate zero, which is equivalent to saying that any particular value of W stems from a

sampling distribution with mean of zero. Since the Wilcoxon-test may use the normal distribution as a benchmark when the number of observations is larger than 10, the test-value for W should look like:

$$Z = \frac{(W - \mu_w) - 0,5}{\sigma_w}, \text{ where}$$

σ_w is the standard deviation of the sampling distribution of W, and 0,5 is a correction for continuity

The critical values for z at the 5% significance level (two-tailed test) are 1.960 and 2.576 at the 1% significance level (two-tailed test). The null hypothesis has to be rejected when the z-values are larger than the critical values or lower than their negative equivalents.

4. Empirical Results

Based on the models, tests and approaches we described in the previous chapter, we will introduce and interpret the results we obtained from this event study.

Since the purpose of our study is to be representative at the one hand but not too generalized on the other hand, we first focused on the overall effects of joint venture announcements on our sample of 100 companies and then broke the study down in sub analysis of the 4 main modes of joint ventures: international, domestic, horizontal and vertical (diversifying) in order to provide the study with more explanatory power.

In the methodology-chapter we defined the Abnormal Return (AR) and the Cumulative Abnormal Return (CAR) as the base instruments for proving if the JV-announcements have any considerable consequences for the daily returns of the companies, entering into JV. Exactly the AR/CAR-development can be used in general to test once again the existence of efficient market.

4.1 General Results

The graphic below presents the behavior of Average Abnormal Returns (AAR) during the event window. There seems to be no strong and clear tendency of upward or downward movement of the daily abnormal returns within the 39days of examination. The AAR-s rather fluctuate on a small scale around the null. The mean of all 39 average abnormal returns is therefore not surprisingly equal to 0. The t-test used to indicate a significant abnormal return detected only 3 days on which AAR are significantly different from 0 at the 5% significance

level. These are namely days -18, -7 and 7. At the 1% significance level there is no single day with significant abnormal return.

The results of the test on the CAR are summarized in *table 1* and *figure 1*

Figure 1

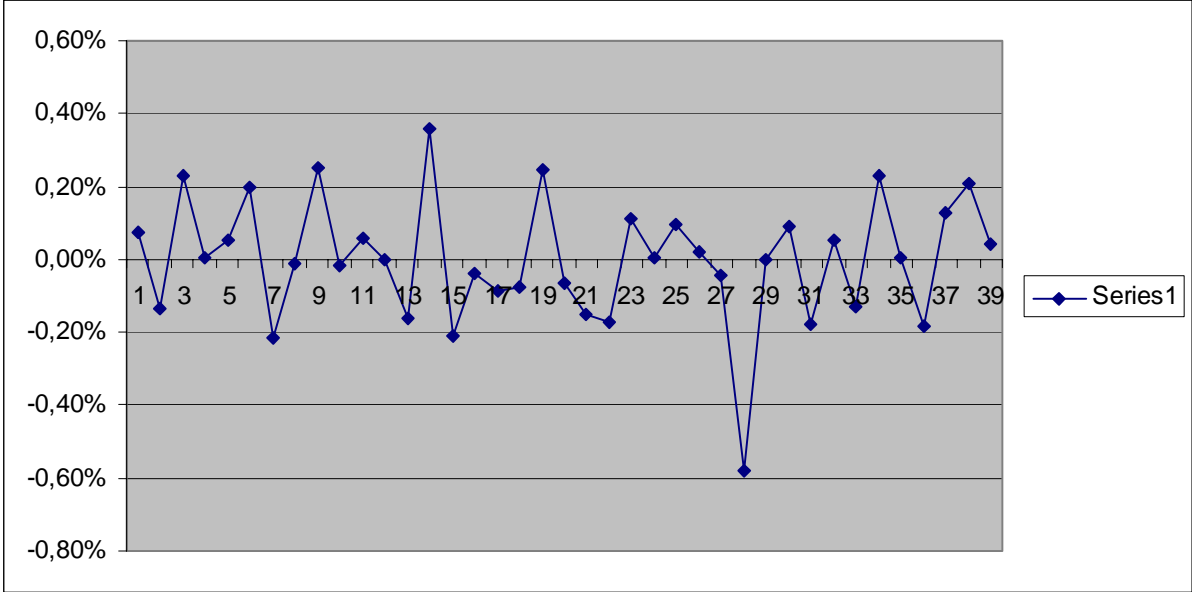


Table 1

CAR(t1,t2)	t-value	Ho
CAR(-20,-1) 0,00514731	0,537767	don't reject
CAR(-5,5) -0,00342089	-0,27319	don't reject
CAR(-1,1) 0,00026771	-4,0387	reject
CAR(1,19) -0,00437074	-0,35863	don't reject

Significant cumulative average abnormal return can be observed in the period surrounding closely the event day 0. The post-event CAR can't be assigned significant deviation from the null. It is interesting to mention that the CAR-values in the pre-event windows are only positive. The first 8 days after the announcement the CAR-values are still positive but with lower magnitude; thereafter the negative values start to prevail, so that on average the post event window doesn't generate substantial cumulative abnormal return.

The table below summarizes the results of the B-sign test in comparison with the already mentioned standard t-test, within the event window. The binomial sign-test(B-value) is used to test if the proportion of positive average abnormal returns in the test period is significantly different from the proportion of positive returns expected under the null hypothesis-namely 0.5.

Table 2

Event window days	Average AR	t-value	% positive AAR	B-sign values
-20	0,07%	0,759267	54,76%	0,872871561
-19	-0,13%	-1,07173	40,48%	-1,74574312
-18	0,23%	2,114678	60,71%	1,963961012
-17	0,00%	0,035255	53,57%	0,654653671
-16	0,05%	0,508803	48,81%	-0,21821789
-15	0,20%	1,021041	51,19%	0,21821789
-14	-0,21%	-1,32643	38,10%	-2,1821789
-13	-0,01%	-0,0971	44,05%	-1,09108945
-12	0,25%	1,641996	54,76%	0,872871561
-1	-0,02%	-0,15105	45,24%	-0,87287156
-10	0,06%	0,543532	44,05%	-1,09108945
-9	0,00%	-0,00387	53,57%	0,654653671
-8	-0,16%	-0,90634	45,24%	-0,87287156
-7	0,36%	2,08826	53,57%	0,654653671
-6	-0,21%	-1,96953	41,67%	-1,52752523
-5	-0,04%	-0,32085	53,57%	0,654653671
-4	-0,09%	-0,83559	44,05%	-1,09108945
-3	-0,08%	-0,5311	47,62%	-0,43643578
-2	0,24%	1,167712	61,90%	2,182178902
-1	-0,07%	-0,29629	59,52%	1,745743122
0	-0,15%	-0,95196	42,86%	-1,30930734
1	-0,17%	-1,41473	44,05%	-1,09108945
2	0,11%	0,819431	46,43%	-0,65465367
3	0,00%	0,02586	54,76%	0,872871561
4	0,10%	0,873136	57,14%	1,309307341
5	0,02%	0,146714	54,76%	0,872871561
6	-0,05%	-0,3965	41,67%	-1,52752523
7	-0,58%	-2,09648	34,52%	-2,83683257
8	0,00%	-0,01788	50,00%	0
9	0,09%	1,025938	51,19%	0,21821789
10	-0,18%	-0,70294	36,90%	-2,40039679
11	0,05%	0,604022	50,00%	0
12	-0,13%	-1,22403	44,05%	-1,09108945
13	0,23%	1,467725	57,14%	1,309307341
14	0,00%	0,051682	46,43%	-0,65465367
15	-0,18%	-1,43505	40,48%	-1,74574312
16	0,13%	1,440403	48,81%	-0,21821789
17	0,21%	0,925769	41,67%	-1,52752523
18	0,04%	0,338624	51,19%	0,21821789

It is obvious that on 16 days out of 38 the share of positive average abnormal returns is larger than 50%. This percentage on the event day 0 is significantly lower than 50%. AS we stated above the cumulative abnormal return in the pre-event window is positive during the whole period. At the same time the number of days with dominating positive returns is equal in the pre-event and the post event window. This implies that the magnitude of positive abnormal

returns in the pre-event window returns is larger than the one of positive returns during the post-event period.

In addition we employed the t-paired test, to see if there are any substantial differences in the average abnormal returns in the pre-, and post event period. The test values are insignificant both at the 5% and at the 1% level.

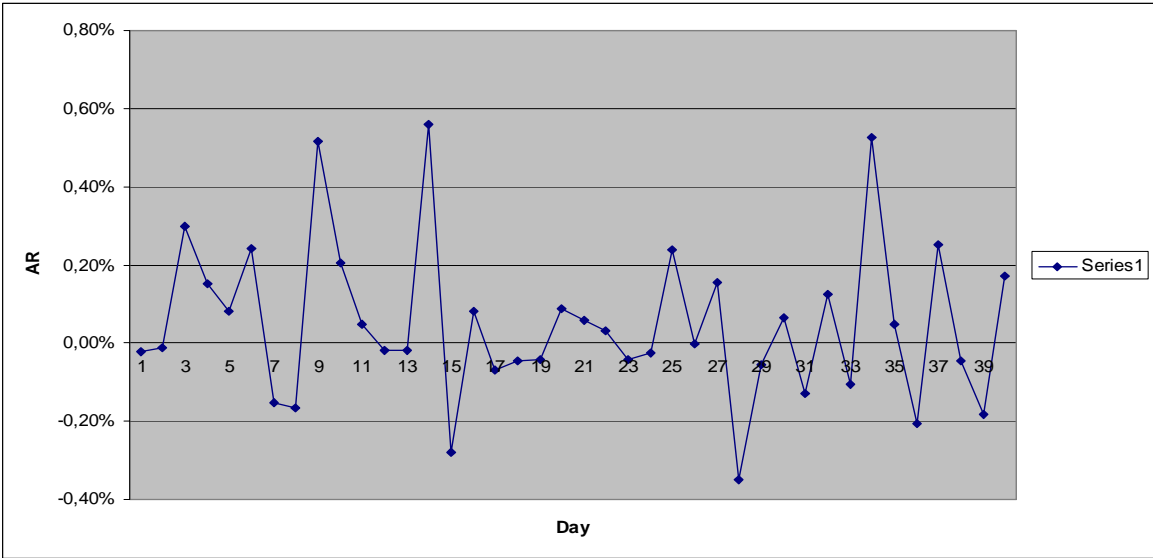
The Wilcoxon signed-rank test, which is the non-parametric alternative to the t-paired test, delivered results, supporting fully the paired t-test results- namely there are no significant differences in the values of the AARs in the pre-event and post event window. The results of all tests seem to be consistent-the Joint Venture-announcements apparently don't have significant impacts on daily stock returns.

4.2 Announcement-effects on domestic joint ventures

As stated above we broke down our analysis, so that we compare the overall results we already presented with the results of the separate examination of the four main modes of joint ventures. In this section we present our findings about the reactions of AAR, when domestic Joint Venture formation is announced. Domestic are JV-s formed by partner companies, originating from the same country. The proportion of domestic JV-s in our study is 45%.

The table below presents the average abnormal return of the sub sample of announcements about international join ventures. On half of the days of the event window the negative Average Abnormal Returns prevail, unlike the AAR-s of the general sample, presented above, where positive returns dominate. The AAR on day 0 is 0,06% which is insignificant deviation from the null. So, on the announcement day no shareholder in the companies announcing the formation of a domestic JV seems to be deeply affected by this information.

Figure 2



From the graph is obvious that in the period directly surrounding $t=0$ the stock returns development is more moderate (close to 0) than the one in the period $t(-15,-5)$ and $t(13, 17)$. Unlike the behavior of abnormal returns of the whole sample of companies examined, the AAR-s in this case are not so temperately fluctuating around the null. Anyway the AAR-values within the event window are not significantly different from 0 except of the values for days -12,-8 and 14.

The CAR for the whole period of 39 days is rising till the event day and after that follows a stable course with no significant fluctuations, which supports the hypothesis that the stock prices have adjusted fast to the new information released. The CAR value for the period $t(-1,1)$ is positive and significantly different from 0 so that the null hypothesis should be rejected.

Table 3

CAR(-t,t)	t-value	Ho
CAR(-19,-1) 0,0144	1,563212	don't reject
CAR(-5,5) 0,0027	0,911293	don't reject
CAR(-1,1) 0,0018	3,762008	reject
CAR(1,19) 0,0047	0,548662	don't reject

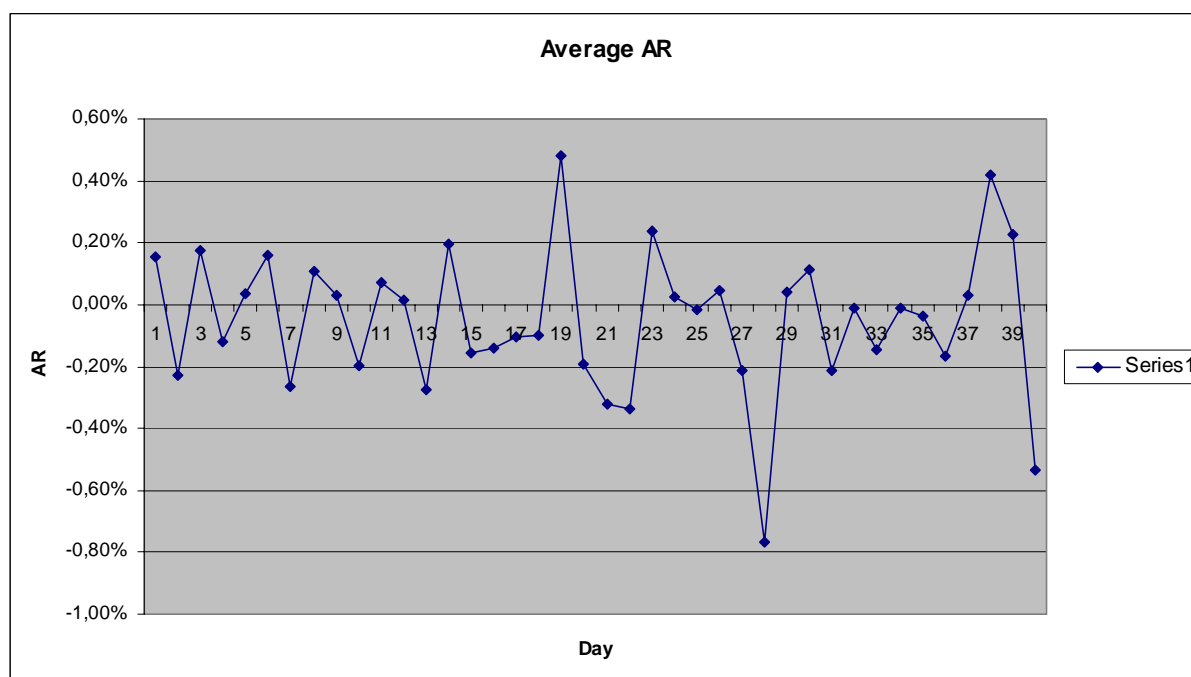
The binomial sign test delivered the following results: on 21 days out of 39 the proportion of companies enjoying positive abnormal returns was less than 50%, on 8 days it is exactly equal to 0 and on only 12 days it is higher than 50%. Compared to the overall results the number of days on which the proportion of positive returns is higher than 0,5 is significantly lower.

The t-paired test and its non-parametric equivalent-the Wilcoxon signed rank test establish that no noteworthy changes in the AAR-values before and after the event occurred. From all the tests mentioned we can infer that the JV-announcement was seen rather as negative news, but not powerful enough to have any significant implications for investors' reactions and stock prices changes.

4.3 International

International joint ventures are established when the country of origin of the partners are different. The number of this type of JV prevails in our study- international joint ventures account for 55%.

Figure 3 below illustrates AAR-s of companies, establishing international JV



The t-test proved that there are no significantly high abnormal returns except of the abnormal returns on 3 days. One of them however is exactly on the day before the announcement, which can be seen from the table. It is also important to mention that this price increase is offset immediately on the next day and seem to be followed by almost only negative abnormal returns after the announcement. The few positive returns that occurred in the post-event window are rather closer to zero unlike the positive AAR-s before the event day.

The standard t-test on the average abnormal cumulative return is summarized in

table 4

CAR(-t,t)	t-value	Ho
CAR(-1,1) -0,0085	-6,117862946	reject
CAR(-19,-1) -0,0035	-0,409488924	don't reject
CAR(-5,5) -0,0042	-0,533423884	don't reject
CAR(1,19) -0,0131	-1,101434835	don't reject

The cumulative abnormal return seems to be significantly high only in the 3-day period around the event day. Longer testing periods deliver negative values for CAR, but they are statistically insignificant (like for example the whole post-event window CAR, which is negative due to the dominance of almost only negative AAR-s after the event).

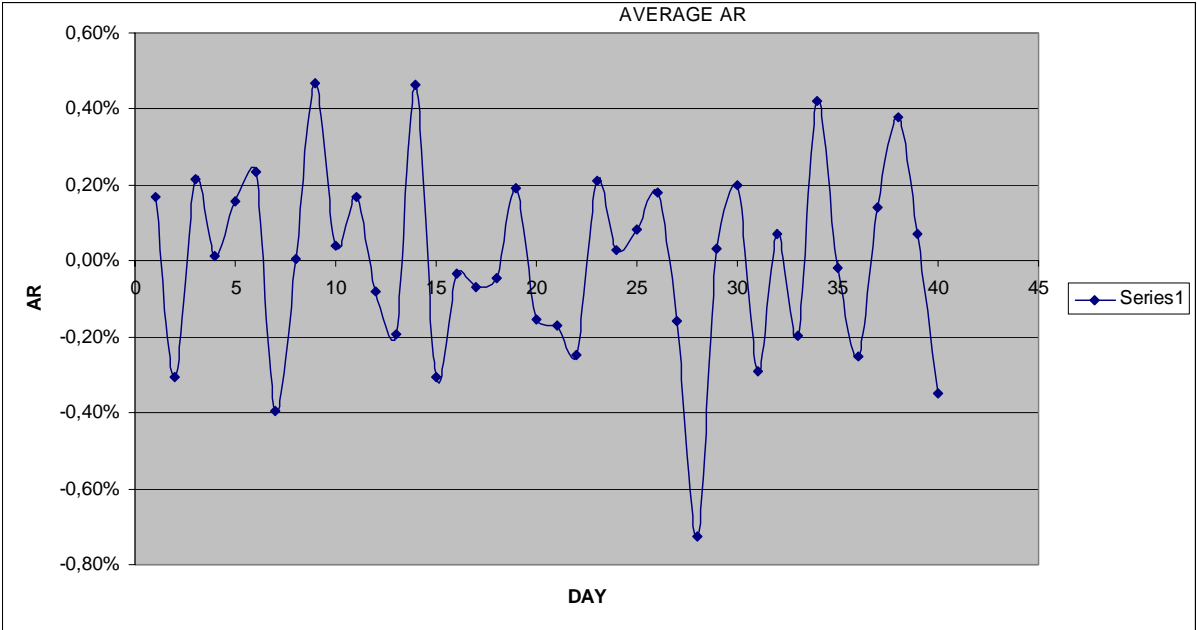
According to the binomial sign test only on 10 days the percentage of companies with positive abnormal returns is higher than 50%. The number of days with positive average abnormal returns is 17, which means that the magnitude of positive abnormal returns has been larger than the one of negative returns.

The paired t-test delivered value of 0,530013, which is considerably lower than the critical value of 2.0040. That implies that there are no substantial differences in the values of abnormal returns of the two sub samples of the event window. The Wilcoxon signed rank test supports this outcome.

4.3 Horizontal JV

Horizontal joint ventures emerge when the parent company and the new entity created operate in the same industry. It is very interesting to compare the results of the effects on stock prices in the horizontal and in the vertical mode, because the rationales for their formation are different.

Figure 4 illustrates the behavior of AAR of companies forming horizontal joint ventures



It is obvious that the stock returns behavior is relatively moderate in the period ranging from $t=-5$ to $t=5$. Compared to the other sub samples we already presented, the sample of returns of companies with horizontal joint venture announcements is obviously more volatile, which is obvious both from the graph and from the estimated standard deviation. The scale of deviation of AAR-s from 0 is also more demonstrative compared to the other samples presented.

The full effect of the announcement however couldn't be captured fully by only analyzing the AAR-values. The CAR behavior, summarized in the next table, has more explanatory power.

Table 5

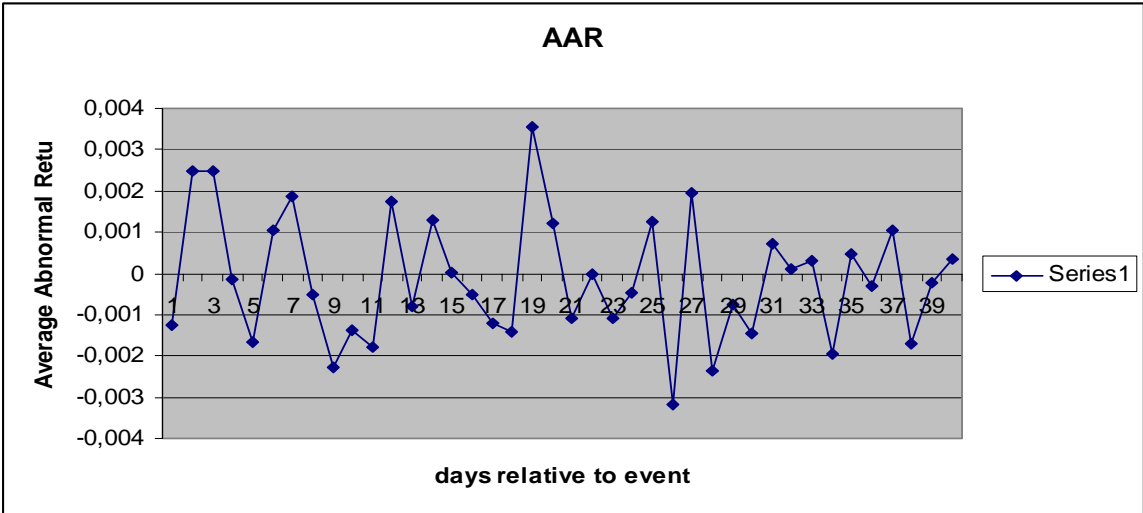
CAR(-t,t)	t-value	Ho
CAR(-20,1) 0,0037	0,51831	don't reject
CAR(-5,5) -0,0002	-0,03873	don't reject
CAR(-1,1) -0,0057	-6,54984	reject
CAR(1,19) -0,0041	-0,34159	don't reject

The CAR index for this sample is rapidly rising to the -15th day relative to the event day. Hereon follows a period with gradual decrease in values till relative stability. This case comes to support the hypothesis that substantial abnormal returns are generated immediately around the event day, while any further accumulation of abnormal returns 'tempers' the CAR level. The horizontal-JV-sample is the first to have more than half of the event period with proportion of positive abnormal returns higher than 0.5-namely on 21days. Both the Wilcoxon and the t-paired test don't indicate sufficient changes in the AAR-values before and after the event.

4.5. Vertical

Vertical joint ventures are created when the industry in which the parent company and the new entity are engaged differ. The motivations behind this type of partnership range from spreading risk and costs, through economies of scope till obtaining access to know-how. If the announcement about exactly this mode of JV has any special impacts on stock prices is to be examined in this section.

Figure 5



The graphic illustrates the development of AAR after vertical joint venture announcement. This sample is the first where the reaction of AAR-s on day 0 is not only so demonstratively positive but also with evidently with much higher magnitude than the other significant deviations from 0. It is also obvious that the extend to which returns fluctuate around 0 is more moderate after the announcement. Positive returns are very close to the null, while the negative ones deviate on a larger scale. So the announcement effect, materialized in significant price increase on the event day, fades away already on the next day.

Table 6

CAR(-t,t)	t-value	Ho
CAR(-19,-1) 0,00394	0,35362201	don't reject
CAR(-5,5) -0,00305	-0,5198418	don't reject
CAR(-1,1) 0,00013	0,7814235	don't reject
CAR(1,19) -0,00731	-1,2707038	don't reject

The fact that the price increase is not sustained further in the post-event window(the other two more obvious positive deviations don't seem to be a direct consequence of the announcement) implies a CAR-level of no statistical significance for the period t(-1,1) in opposition to the rest of the JV-modes examined.

According to the binomial test the number of days on which the percentage of companies with positive abnormal return is higher than 50% is only 10. Both Wilcoxon and the t-paired test don't detect substantial changes in AAR-values before and after the event.

5. Summary

5.1 Conclusions

The purpose of our study is to test for efficiency the German stocks market(Frankfurter Wertpapierbörse) in the background of stock price reactions after joint venture announcements. We were also interested how the different types of joint ventures (international, domestic, vertical and horizontal) affect returns, are there any strong tendencies in their stock prices behaviour, and what are the results of the comparison to the overall results, where joint ventures are examined without differentiation. In the beginning of our study we had many expectations, which were seriously repudiated after carrying out all relevant computations and tests.

Before starting with drawing any inferences we need to have a brief look at the summarized test results in order to have better overview.

Table 7

	All companies	Domestic	International	Horizontal	Vertical
AAR on day 0	negative/insignificant	positive/insign	positive/insign	negative/insign	positive/sign
CAR(-20,-1)	insignificant	insignificant	insignificant	insignificant	insignificant
CAR(-5,5)	insignificant	insignificant	insignificant	insignificant	insignificant
CAR(-1,1)	significant	significant	significant	significant	insignificant
CAR(1,19)	insignificant	insignificant	insignificant	insignificant	insignificant
NR Bsign+	16	12	10	21	10
t-paired value	insignificant	insignificant	insignificant	insignificant	insignificant
Wilcoxon value	insignificant	insignificant	insignificant	insignificant	insignificant

Although the outcomes of our study on the 4 subsets of companies may look quite similar at first sight, there are considerable differences, which explanation contributed considerably to our understanding of the subject.

While all cumulative abnormal return(CAR) values for the whole pre-event window:t(-20,-1), for the whole post-event period t(1,19),as well as for t(-5,5) turned out to be insignificant for all 4 JV-modes, it is still worth comparing their signs and levels.

The CAR for international JV-announcements is strictly negative, while those for domestic JV are strictly positive. The positive values for domestic-CAR-s arise from the higher number and scale of positive average abnormal returns compared to those for international JV-s. We suggest that the rather negative reaction to international JV-announcements is possibly based on the negative perception of economic power of the country of origin of the partner company as well as the possible cultural differences, which can easily materialize in serious obstacles. Further the companies entering international JV were already performing below the market average before the JV decision, so that the stock prices reaction can be seen as the consequence of poor performance and not its cause.

The direction of movement of stock prices after the event day is not quite clear, so that inferences about market (in) efficiency couldn't be drawn completely. Anyhow a brief look at the CAR development in the post-event period imply that no substantial abnormal returns are cumulated, which would lead to the conclusion that the market is efficient here.

As we stated above the reaction to domestic JV-s is positive in our study which is contrary to the findings of other studies-namely domestic joint ventures announcements bring negative abnormal returns at the announcement day and in the post-vent window. Moreover the positive effect of the information release in our sample is relatively sustained, because both the number and the magnitude of positive returns after the event day are significantly higher than those of negative ones. One possible explanation of the positive behaviour of returns after domestic JV-announcement in our work could be attributed to the fact that almost all domestic joint ventures in our sample are between Japanese companies, which are known for being more reserved to partnerships with western firms, which account for the rest of companies included in the study.

The CAR of this sample doesn't change substantially after the announcement day, which as in the case of international JV-s can lead to the conclusion that the prices have already incorporated the new information.

We were surprised regarding the results of our vertical JV-s study, because our expectations were towards a more negative stock prices reaction. Normally investors are not in favour of companies forming vertical (diversifying) joint ventures, because the less the core activities of the companies are related to the activities of the new entity, the less enthusiastic are investors. This has of course its logical explanation-shareholders see much lower opportunity for the companies to employ their competences efficiently when the distance between core and new activities is so great as one vertical JV would suggest.

The significant positive AAR-values, which we faced in the pre-announcement period however are not quite consistent with this. If we attribute them to leakage of information before the announcement day, investors seem to be rather positive to the new information.

The market seems to be efficient in this case as well, because none of the 4 CAR-values we presented above is at significant level. It is important to mention that not even the CAR (-1, 1) is significant unlike all other CAR values for this period in the rest of the sub samples.

The study on horizontal JV-sample, which also turned out to be the most volatile one, didn't deliver very clear results. On the one hand the reactions of prices around and on the event day are quite moderate, contrary to the expectation that horizontal JV should be welcomed for the same reasons vertical JV-s (as we have just explained) can't. On the other hand our results are not quite different from previous research, claiming that the degree of relatedness of partners' activities doesn't create sufficient value and therefore reactions shouldn't necessarily be

strongly positive. As in the 3 sub samples presented previously, the stock prices here also seem to have adjusted adequately to the announcement so that no significant cumulative abnormal return could be generated.

If we generalize the overall response to joint venture announcements (based on the results, presented in chapter 4.1) we can conclude that the market reacts rather neutrally. Only on 3 days of the event-window noteworthy deviations were detected, the AAR on the event date is negative but insignificantly different from the mean. The CAR- development also supports this idea. If we try to explain this neutrality with the help of the market reactions to international JV (negative) and domestic-JV-s (rather positive) it turns out that their effects offset each other and lead to a relative 'balance', materialized in moderate market reactions on average. If we explain it in the background of the counterpart horizontal-vertical the conclusion is even easier, because both types of JV turned out to be also rather neutral. The overall impression of the market is that it is efficient, since all the tests we employed didn't reject the null hypothesis, claiming for market efficiency.

5.2 Further Research

In our study we focus only on the so called main modes of joint ventures. Joint ventures however can be distinguished in many different ways. Although it is beyond the scope of our paper we would be interested in the effects of and stock prices reactions to technological and marketing development joint ventures. Further the results of a comparison between symmetric (50:50) JV-s and asymmetric ones could be also of interest. It is also known that the size of the partners, forming a JV, the degree of individualism and ownership structure also play a considerable role in the market response to JV-announcements.

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