

TAKEOVER BIDS AND CAPITAL MARKET EFFICIENCY

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This article deals with the structure and evolution of tender offers, takeover prices and the effects of tender offer announcements in the Czech Republic in 2001–2005. Semi-strong form efficiency is examined by means of the traditional event study methodology. Based on the results it is impossible to prove either semi-strong form efficiency of the Czech stock market or trading based on private information.

1. INTRODUCTION

Market efficiency can be understood as an important implicit assumption in financial stability analysis. If stock markets are informationally efficient and new information is immediately reflected in share prices, they can provide a timely warning signal for the assessment of financial stability. Capital market efficiency is also a necessary precondition for share prices to provide accurate information to economic agents. Although Czech capital market and share price stability is not right now a primary issue in financial stability assessment, their influence on this segment can be expected to increase owing to the gradual development of the capital market in the future and as a result of the integration of capital market supervision into the Czech National Bank.

The efficient market hypothesis (EMH) asserts that market prices on a semi-strong form efficient market¹⁵⁸ accurately reflect all obviously publicly available information (i.e. the hypothesis concerns informational efficiency). Information should be reflected in prices on the day it is published or the following day at the latest. If, then, it is possible to achieve abnormal returns (i.e. unusually high returns from the economic point of view) based on new public information, the market is considered as semi-strong form inefficient. Semi-strong form efficiency is usually tested by analysing the market's responses to new information as compared to the expected behaviour based on a selected model (the event study approach). In this article semi-strong form efficiency is tested on the Czech stock market using the Capital Asset Pricing Model (CAPM), a simple index model and a control market portfolio. The effects of announcements of tender offers for shares of minority shareholders are examined on the Prague Stock Exchange and RM-System.

This article is structured as follows. Section 2 briefly describes the basic statistics of takeover bids, their structure and changes over time. In section 3 the relationship between average prices and tender prices and its development over time is analysed. In section 4 semi-strong form efficiency is tested on the Czech capital market using the event study methodology.

2. STRUCTURE OF TENDER OFFERS

Despite the various reasons for takeover bids, a common feature of them is that a market regulator tries to guarantee minority shareholders' right to an equitable price for their share in the company's assets.¹⁵⁹ Depending on the characteristics under discussion, the analysis concerns (a) all types of tender offers, (b) individual types separately, or (c) mandatory takeover bids only.

A total number of 443 offers to purchase minority shareholders' shares were recorded between 2001 and 2005. Three-quarters of them involved mandatory takeover bids resulting from gaining control of a company or exceeding thresholds establishing a tender offer obligation.¹⁶⁰ Delisting-related offers accounted for 20% and voluntary offers for 3% of cases. The rest consisted of other offers, i.e. voluntary ones having the character of

¹⁵⁸ For the traditional classification of efficiency with respect to information sets that prices should reflect (weak form, semi-strong form and strong form), see Roberts (1967).

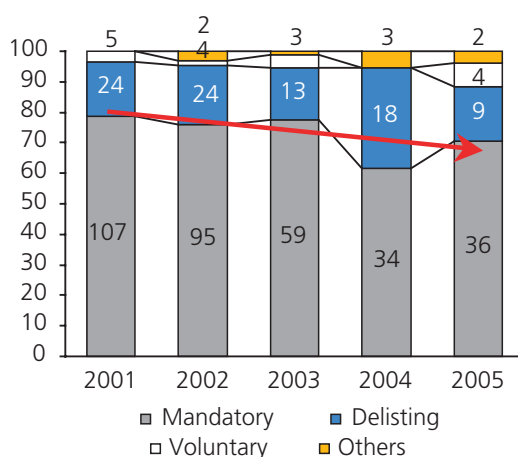
¹⁵⁹ The possible reasons for tender offers include a new majority shareholder (or controlling shareholder) gaining control of a company or increasing its share above a particular threshold; an AGM (de facto a controlling shareholder) deciding to delist shares, usually with a major impact on their liquidity; or a controlling shareholder trying to further strengthen its stake (influence) in a company by making a voluntary offer and buying up minority shareholders' shares. "Tender offer" and "takeover bid" are regarded as synonyms in this text.

¹⁶⁰ Two-thirds or three-quarters of the voting rights (Article 183b of the Commercial Code).

mandatory ones, or purchase offers.¹⁶¹ Chart 1 illustrates the structure of takeover bids over time. The chart shows that the share of mandatory offers has declined slightly over time.¹⁶²

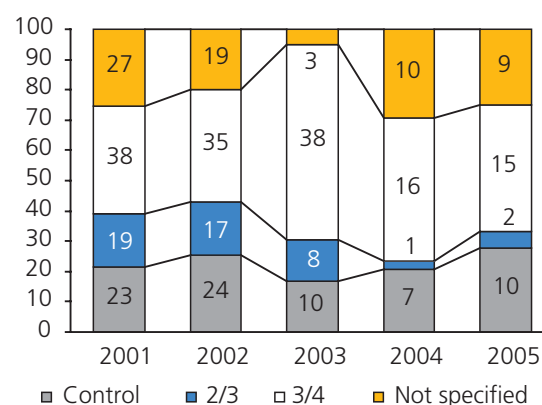
Chart 2 illustrates the breakdown of mandatory offers by the reason for their initiation (a total of 331 cases). The prevailing reason was the exceeding of a three-quarter threshold. Gaining control of a company¹⁶³ was significant as well. Chart 2 also shows that while acquisitions of smaller stakes occurred more often in the first two years of the period under review, exceeding the three-quarter threshold has recently prevailed as the main reason for the establishment of an obligation to make a takeover bid. This may be a result of a growing concentration of ownership in publicly traded companies.

Chart 1 – Evolution of takeover bid types over time
(figures denote number of bids, %)



Source: CNB

Chart 2 – Mandatory takeover bids by reasons of initiation
(figures denote number of bids, %)



Source: CNB

Note: The individual categories denote the reaching or exceeding of a share of the voting rights in the company, i.e. the gaining of a controlling (40% or more), two-thirds or three-quarters stake. Bids for which no figure was available are included under "Not specified". For more details, see the Commercial Code (Article 183b).

3. PRICES IN TAKEOVER BIDS – RELATIONSHIP BETWEEN TENDER PRICE AND AVERAGE PRICE¹⁶⁴

In this section the relationship between the tender price and the average price is analysed.¹⁶⁵ On an efficient market, the ratio of the tender price offered to minority shareholders to the average price at which a share has recently been traded expresses the willingness or unwillingness of a takeover company to pay a premium to acquire additional shares or to share the majority premium with minority shareholders. It can also indicate the level

¹⁶¹ "Purchase offer" means the right of a minority shareholder to call on a supervisory authority (the CNB) to impose on a shareholder of a company or shareholders acting in concert having 95% of the voting rights the obligation to repurchase the remaining securities (Article 183f of the Commercial Code).

¹⁶² This may be caused, inter alia, by growing stabilisation of ownership relations in companies listed on regulated markets in the Czech Republic following the turbulent period of structural and ownership changes in the 1990s. In section 2, offers are assigned to individual years according to the date of establishment of the obligation or announcement of the offer intention, or alternatively according to the date when an offer is received by the regulator.

¹⁶³ Exceeding a 40% share of the voting rights is regarded as gaining control of the company, unless the company has another shareholder with a larger share.

¹⁶⁴ The tender price is the price per share which is offered to minority shareholders in tender offers. In the case of mandatory takeover bids, the average price expresses the weighted average of prices at which transactions were executed in the six-month period prior to the establishment of the obligation to make a takeover bid which were registered by the Czech Securities Centre (i.e. including the transactions initiating the takeover bid). Average prices are based on figures stated in tender offer announcements. The accuracy of the calculation of the average prices given by the Securities Centre and, in particular, the input data used for averaging could not be verified.

¹⁶⁵ Absolute outliers are excluded from the sample so that they do not significantly distort the results of the analysis. Some ratios relate to mandatory takeover bids only. Unlike in section 2, tender offers are arranged along the time axis according to the time of their announcement, hence numbers of bids may differ in individual years.

of market efficiency; if a market is inefficient, the difference can, besides the aforementioned, indicate that shares are incorrectly priced on the capital market.¹⁶⁶

The relationship between the tender price and the average price is shown in Table 1. The table reveals that the average premium offered to minority shareholders in mandatory tender offers amounted to 25% of the six-month weighted average price, irrespective of the bidder's domicile (domestic or foreign).¹⁶⁷ In roughly 80% of cases the tender price exceeded the average price; outliers occur more frequently with a positive sign. Bidders are therefore either willing (or forced) to share the majority premium (or part thereof) with minority shareholders, or the Czech market is inefficient and prices do not reflect the fundamental value of shares. In the case of voluntary offers, the median is higher than in the case of mandatory and public offers, although given the low number of observations this difference should not be overestimated.

Table 1 – Ratio of tender price to average price by entity and offer type

	Total	Domestic	Foreign	Mandatory	Voluntary	Public
No. of offers	219	169	50	153	16	50
Mean	1.25	1.26	1.22	1.24	1.29	1.27
Median	1.07	1.07	1.07	1.06	1.22	1.06
Max	5.56	5.56	5.17	5.56	2.80	5.08
Min	0.22	0.22	0.49	0.22	0.64	0.45
Std. deviation	0.65	0.64	0.66	0.63	0.47	0.75

Source: CNB

The first part of Table 2 shows the ratio of the tender price to the average price, i.e. the premium, for mandatory takeover bids in relation to the reason establishing the tender obligation.¹⁶⁸ A premium offered in a tender after gaining control of a company can be justified, for example, by the effort of the shareholder(s) holding a significant stake in the company to reach the majority. From comparing with the average premiums offered when the higher thresholds are exceeded one cannot say that the majority premium depends on a growing share in a company and that bidders are more motivated by successful realisation of tenders.¹⁶⁹

The second part of Table 2 shows the average ratio of the tender price to the average price over a five-year period. As can be seen, after two years of relatively low premiums the mean and, in particular, median increased markedly in 2005. This is inconsistent with the assumption of standardisation of the Czech capital market and an improving information content of prices.

Table 2 – Ratio of tender price to average price by reason for establishment of obligation and its evolution over time

	Control	2/3	3/4	Not distinguished	2001	2002	2003	2004	2005
No. of offers	29	20	73	97	61	57	35	34	32
Mean	1.20	1.23	1.19	-	1.18	1.32	1.24	1.20	1.31
Median	1.06	1.16	1.02	-	1.09	1.06	1.03	1.05	1.16
Max	2.50	2.29	5.17	-	2.50	5.56	5.17	4.00	3.21
Min	0.49	0.57	0.31	-	0.80	0.22	0.57	0.45	0.39
Std. deviation	0.38	0.34	0.58	-	0.29	0.87	0.75	0.58	0.59

Source: CNB

¹⁶⁶ However, one also needs to take into account a usual time span between the period from which the average is calculated and the period of validity of a takeover bid, which is 5–6 months. Given the stock investor's usual required return, the time span represents roughly a 5% difference in value.

¹⁶⁷ The criterion for dividing entities into domestic and foreign companies is their legal form, i.e. whether they were established under Czech or foreign law.

¹⁶⁸ The category "Not distinguished" includes mandatory takeover bids for which one of the prices is unknown, and other types of tender offers.

¹⁶⁹ Actions could be motivated by an effort to minimise the share of minority shareholders and to exceed a threshold allowing a bidder to make a purchase offer with subsequent delisting of shares or dissolution of the company with the majority shareholder taking over the equity (or to squeeze out minority shareholders). Under the Commercial Code, three-quarters of the votes present are needed for the approval of a change of type or form of shares or delisting of shares. A 90% share of the company's capital is needed for transferring the equity to shareholders and squeezing out minority shareholders.

Chart 3 shows the average premium over time using the moving average of premiums/discounts of tender prices (where available) for the last 60 offers prior to the given date relative to the six-month average price. Despite the significant volatility of the values, a declining trend in recent years, except for 2005, is obvious.¹⁷⁰

Chart 3 – Moving average of premiums/discounts of tender price relative to average price
(in %)



Source: CNB

4. TAKEOVER BIDS AND SEMI-STRONG FORM MARKET EFFICIENCY

A variety of approaches are applied for testing market efficiency. The choice usually depends on the nature of the information being analysed. As mentioned in the introduction, market prices on a semi-strong form efficient market accurately reflect all publicly available information, which is absorbed on the day it is published or the following day at the latest (depending on the time at which it is published during the day). Semi-strong form efficiency is thus tested on the basis of newly published fundamental information on traded instruments (e.g. the announcement of share splits, financial results, acquisitions, etc.), generally using the event study approach, where the behaviour of potential excess returns on days around the aforementioned event is examined. In this article the reaction time of share prices to announcements of takeover bids (in the form of newspaper advertisements) is analysed for individual shares traded on the Czech stock exchange and the OTC market.

The publication of the tender offer terms provides a minority shareholder with two fundamental pieces of information. If an offer is considered as a shareholder's put option acquired at zero cost, the announcement contains information on the exercise price of the option and thus determines its value. If this information is new and unexpected, it should be reflected in the price. According to the EMH, market prices should adjust very fast, in a single move, mostly during the day on which it is published.¹⁷¹ The second fundamental piece of information arising from the offer, and particularly from the tender price, concerns the future liquidity of the shares. The higher the price, the higher the probability of a decline in the free float and thus also of a decrease in the liquidity of the shares.¹⁷²

¹⁷⁰ Starting in 2002, the average premium gradually declined, reaching a minimum of 15% at the beginning of 2005. The increase in the average premium in April 2005 is due to a few tenders in the mining and energy sectors; after adjustment of the series a continuing slight downward trend to 9% at the end of 2005 would be visible.

¹⁷¹ Note that bids are announced in the national press, so participants have a whole trading day to assess the information and react accordingly.

¹⁷² It can be also expected – specifically on the Czech stock market – that a new owner intending to delist shares or squeeze out minority shareholders will offer a higher price in order to acquire the necessary qualifying stake at the General Meeting.

The tender price can also be viewed as the bidder's estimate of the share value. Since takeover companies usually have more detailed information on the firm being taken over than ordinary minority shareholders, the relationship between the tender price and the market price determines the response of the market price to the tender announcement. Realised offers are therefore divided into two subsets: cases where the market price exceeds the tender price and cases where the opposite applies.

Data

The EMH is tested using CNB data on tender offers for publicly traded companies on the Prague Stock Exchange (also referred to as the "PSE" or "stock exchange") between December 2000 and November 2005 and in the RM-System (also referred to as "RM-S") between June 2000 and September 2005. Daily returns were calculated based on time series of market prices of shares running from January 1998 to December 2005 in the case of the stock exchange and from December 1998 to December 2005 in the case of the RM-S. The set under analysis contains 145 and 351 takeover bids for shares listed on the PSE and RM-S respectively. Adjusted for non-traded shares, 92 and 249 cases on the PSE and RM-S respectively remained for the purposes of analysing price responses to takeover bid announcements.¹⁷³

Methodology

The standard event study methodology is applied to test price responses to new and unexpected information.¹⁷⁴

After calculating the actual returns on a given share around an announcement date, the "equilibrium returns" are determined and compared with the actual returns on the share.¹⁷⁵ Three approaches to determining the equilibrium (daily) returns are applied:

- | | |
|---|--|
| 1) CAPM: | $\tilde{r}_{it} = r_{ft} + \hat{\beta}_i (r_{mt} - r_{ft}),$ |
| 2) simple index model (IM): | $\tilde{r}_{it} = \hat{\alpha}_i + \hat{\beta}_i r_{mt},$ |
| 3) control portfolio (CP): ¹⁷⁶ | $\tilde{r}_{it} = r_{PX-Glob}.$ |

In the case of the CAPM and the index model, the market return r_{mt} is represented by the PX-Glob index. The three-month PRIBID is substituted for the risk-free interest rate. The CAPM and IM parameters are estimated by regressing for each share separately using the least squares method, although only in cases where the time series is sufficiently long. The difference between the actual return and the equilibrium return represents the abnormal return achieved for the share.¹⁷⁷ The cumulative abnormal returns on individual shares are then obtained by adding the subsequent abnormal returns as from the announcement date. The average cumulative abnormal return (CAR) is determined by averaging these values for all the shares. The final steps consist in verifying the statistical and economic significance of the results.

¹⁷³ The set was adjusted for cases where trading data were unavailable for a sufficiently long period prior to the takeover bid announcement (data were usually required at least 50 trading days prior to the announcement).

¹⁷⁴ The event studies literature includes Ball and Brown (1968), Ball (1978), Fama, Fisher, Jensen and Roll (1969) and Scholes (1972); in the Czech Republic, for example, Filip (1999), Filip (2000) and Jindřichovská and Rhys (2000) have applied the approach.

¹⁷⁵ The actual returns r_{it} on a given stock i at time t were calculated using the equation $r_{it} = (P_{it} - P_{it-L}) / P_{it-L}$, where P_{it} stands for the market price. L denotes the "event window", which should be sufficiently long, usually four or six weeks.

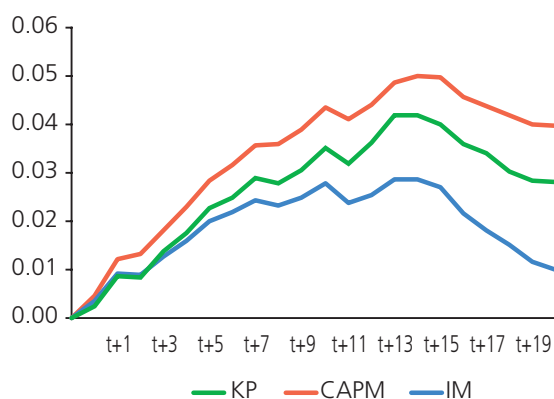
¹⁷⁶ See Sharpe (1964) for more details on the CAPM and Sharpe (1963) for more details on the index model. In the case of the control portfolio, the expected estimated return is assumed to equal the return on the control market portfolio, i.e. the return on the PX-Glob index. If the selection is sufficiently representative, the results obtained when using this model and the CAPM are very similar (deviations are created, inter alia, by different weights of shares in the index and by other factors).

¹⁷⁷ Formally, the excess return on stock i at time t can be written as $\tilde{u}_{it} = r_{it} - \tilde{r}_{it}$

Results of testing the reaction to the tender offer announcements

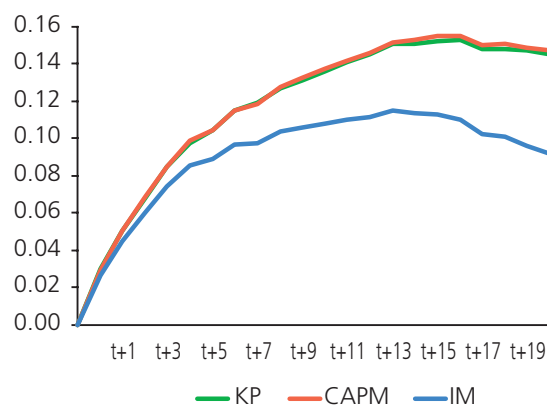
In the following section, conclusions of the analysis are presented. Chart 4 shows the average cumulative abnormal returns in the 20 days after the announcement of 92 tender offers to purchase shares listed on the Prague Stock Exchange. Market responses are most evident when the CAPM is used to calculate the expected return.¹⁷⁸ When the other two approaches are applied, the shape of the cumulative abnormal return curves is similar, but the absolute values are lower. Share prices on the Prague Stock Exchange therefore adjust gradually to new information on tender offers for minority shareholders' shares. Chart 5 analogously shows the reactions to 249 offers in respect of companies listed on the RM-S market. Here, too, a slow and gradual response to tender price announcements is evident.

Chart 4 – Reaction of share prices to tender offer announcements (PSE)



Source: CNB

Chart 5 – Reaction of share prices to tender offer announcements (RM-S)



Source: CNB

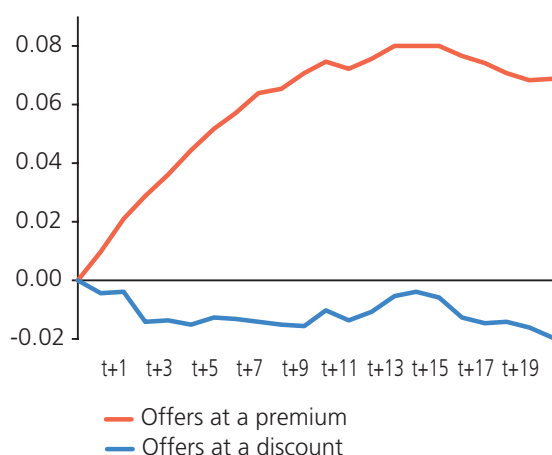
To get a clear idea of the nature of price behaviour, the set of tender offers was divided into three subsets according to whether: (1) the tender price on the announcement date exceeded the market price (offer at a premium), (2) the market price on the announcement date exceeded the tender price (offer at a discount), or (3) neither of the above options was true.¹⁷⁹ On the PSE, the tender price was higher than the market price in 59 cases and lower than the market price in 33 cases. Likewise on the RM-S, the tender price exceeded the market price in 170 cases, and in 76 cases the opposite applied. The next two charts show the results after these adjustments. The red curve shows the behaviour of shares demanded at a premium in tender offers (the tender price exceeded the market price on the announcement date), whereas the blue curve depicts the tender prices of shares demanded at a discount compared to the market price.

¹⁷⁸ The values are statistically significant already on the announcement date and rise continually for ten trading days to 4.3% (99% on an annual basis). The cumulative abnormal return reaches its maximum of 5.0% on the fourteenth trading day after the announcement date (84% p.a.).

¹⁷⁹ The market price is equal to the tender price or the tender price is unknown. This concerned only a minimum of cases. These cases are then excluded from the analysis.

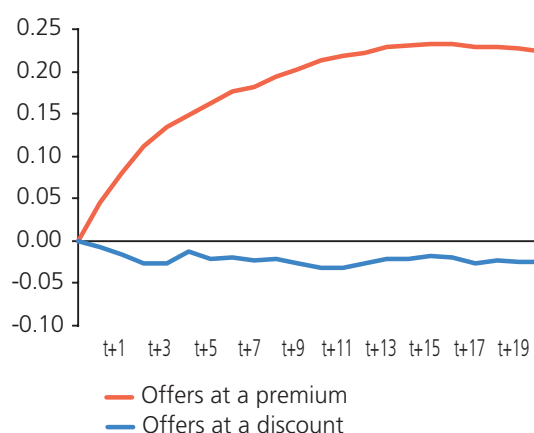
Chart 6 shows the average cumulative abnormal return following takeover bid announcements in the case of shares traded on the stock exchange. It clearly reveals a slow response to new information in the case of companies whose shares are demanded at a premium.¹⁸⁰ Shares traded at a discount show asymmetrical behaviour; no response to announcements is evident.¹⁸¹ Chart 7 shows the reaction on the OTC market. As on the stock exchange, a slow gradual response to new information is evident in the case of offers at a premium.¹⁸²

Chart 6 – Reaction to announcements of offers at premium and discount, CAPM (PSE)



Source: CNB

Chart 7 – Reaction to announcements of offers at premium and discount, CAPM (RM-S)



Source: CNB

So far, abnormal returns have been analysed from the announcement dates onwards. However, market efficiency can also be approached by studying the market behaviour prior to offer announcements, in this case in terms of strong-form efficiency. After widening the event window backwards by ten trading days, it is possible on the basis of abnormal returns to analyse trading based on private information. To highlight the reactions, a separate chart is displayed for the CAPM only. However, using the other two approaches has no effect on the interpretation of results. The red curves represent the behaviour of shares whose tender price exceeded the market price, while the blue curves represent offers at a discount.

Chart 8 shows that prior to announcements the abnormal returns of companies from both subsets behaved broadly similarly on the PSE; only after announcements does the aforementioned differentiation emerge. Such price behaviour indicates that the extent of insider trading related to tender offers is very low or zero. Interpretation of the results for shares traded on the RM-S, which are illustrated in Chart 9, is rather more complex. In this chart, the development of the cumulative abnormal returns estimated using the CAPM is shown. Prior to offer announcements, the cumulative abnormal returns develop more or less identically, regardless of the

¹⁸⁰ The abnormal returns are statistically different from zero in seven days following announcements. The cumulative abnormal return rises to over 8.0% on the fifteenth trading day after the announcement (126% p.a.) and then declines slightly to 7% on the twentieth trading day after the announcement, where it stabilises.

¹⁸¹ The cumulative abnormal loss reaches 1.6% on the twentieth day after announcements as compared to the behaviour expected on the basis of the CAPM; the loss is not statistically significant.

¹⁸² In the case of a premium, the cumulative abnormal return measured on the basis of both the CAPM and control portfolio climbed to around 23% (385% p.a.) on the fifteenth trading day after the announcement. In the case of the index model the figure was 19% (318% p.a.). The cumulative abnormal returns following announcements are statistically significant over the entire reference period, regardless of the approach choice. In the set of offers at a discount, the cumulative abnormal loss on the twentieth trading day after announcements reaches 8.3% (-104% p.a.) using the index model, which represents a statistically significant value, whereas with the CAPM and control portfolio it amounts to 2.5% (-314% p.a.) and is statistically insignificant.

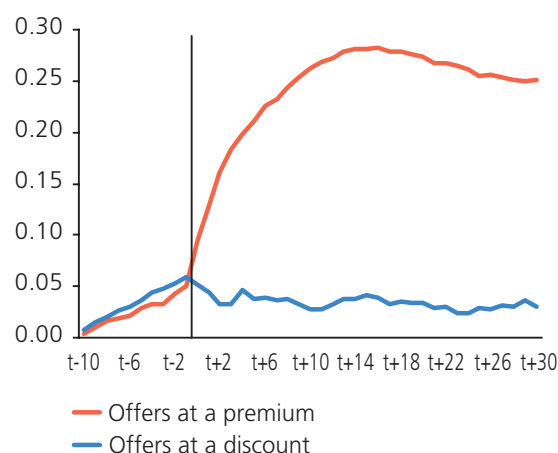
relationship between the tender price and the market price. Unlike on the stock exchange, however, they are rising slightly. Nevertheless, as in the previous case, it is impossible to conclude, based on the aforementioned results, that trading on private information exists on the Czech OTC market. The behaviour of returns on shares demanded in tender offers at a premium and at a discount deviate insignificantly from one another, and the abnormal cumulative return is even higher for shares demanded at a discount. Moreover, as soon as the first day after the announcement, the abnormal cumulative return on offers at a premium exceeds that on offers at a discount by around 9 percentage points, and on the fifteenth day the difference exceeds 24 percentage points.

Chart 8 – Behaviour before and after offer announcements, CAPM (PSE)



Source: CNB

Chart 9 – Behaviour before and after offer announcements, CAPM (RM-S)



Source: CNB

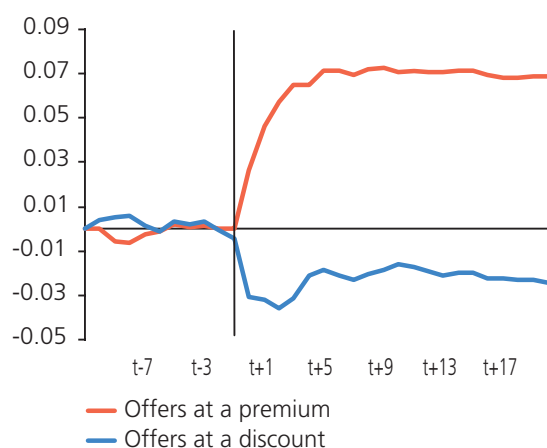
The low liquidity of many analysed shares and the non-trading factor represent challenges to correct interpretation of the results. Assuming that information which is reflected in prices with a time lag due to illiquidity would otherwise be reflected in prices on the first possible trading day, the non-trading factor can be taken into consideration by leaving out those days on which a share was not traded during the first 20 days after the offer announcement date and on which the information could not be reflected in prices.¹⁸³ Such adjusted responses can be observed in Charts 10 and 11 for the PSE and RM-S respectively.

Even after such adjustment, however, market prices react with a delay and gradually to tender announcements, and the market can be described as inefficient in terms of semi-strong form efficiency. It turns out that market prices on the stock exchange react to information on offers at a premium within four days. In the case of offers at a discount, prices respond within three days, while the abnormal returns are statistically insignificant except for the announcement date. These charts also show that in the case of the RM-S, by contrast with the PSE, there is an insignificant difference in market behaviour before and after the adjustment (compare Charts 9 and 10). This

¹⁸³ This approach implicitly and very optimistically assumes that information which is reflected in prices with a time lag due to illiquidity would under normal circumstances be reflected in prices on the first possible trading day.

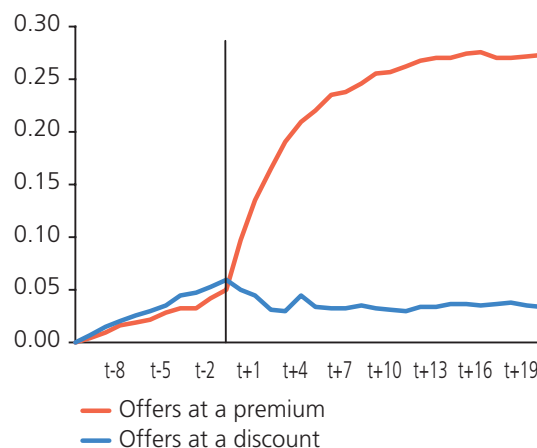
could be interpreted so that the generally lower liquidity in the RM-S leads to slower reflection of information in prices and lower market efficiency compared to the PSE.

Chart 10 – Reaction to offer announcements, adjusted for nonsynchronous trading, CAPM (PSE)



Source: CNB

Chart 11 – Reaction to offer announcements, adjusted for nonsynchronous trading, CAPM (RM-S)



Source: CNB

5. CONCLUSIONS

This study aimed to test the semi-strong form of the EMH on the Czech stock market – the Prague Stock Exchange and the RM-System. After providing an introductory general description of tender offers, including the relationship between tender prices and average prices, the speed and strength of market reactions to tender price announcements were analysed.

To sum up, it is impossible to confirm semi-strong form efficiency on the Czech stock market. Since prices respond gradually to tender offer announcements, significant responses occur primarily for offers where the tender price exceeds the market price. Prices respond gradually even after adjustment for the factor of irregular trading due to low liquidity. Moreover, in 2004 and 2005 tender prices exceeded average prices more significantly than in previous years, which is inconsistent with the assumption of standardisation of the Czech capital market and improving information content of prices. The explanation can be found primarily in insufficient (or only partial) fulfilment of the axioms on which the efficient market hypothesis is based. In particular, factors such as the short history of the market, method and course of privatisation, trading system used or the extent of foreign investor participation affect the market transparency and liquidity, the proportion of illiquid shares, direct and indirect trading costs and thus also efficiency. These conclusions are in line with previous studies testing semi-strong form efficiency on the Czech stock market¹⁸⁴ and on Central European markets,¹⁸⁵ which, with few exceptions, suggest semi-strong form inefficiency.

The results of the analysis of (potential) trading based on private information concerning tender offers turn out positively, as the reactions of prices of shares demanded at a premium and at a discount in tender offers show only insignificant differences until the offers are announced. The growth in cumulative abnormal returns identified on the RM-System prior to announcements can be viewed rather as a result of rational expectations of investors rather than as evidence of insider trading.

¹⁸⁴ E.g. Filip (1999) and Filip (2000).

¹⁸⁵ E.g. Gryglewicz (2004) and Jermakowicz and Gornik-Tomaszewski (1998).

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