Stock Prices and Resignation of Members of the Board: The Case of the Warsaw Stock Exchange

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In this paper we provide an empirical analysis of announcements of resignation of board members using data which comes from the Warsaw Stock Exchange. The market reaction to this information is tested at different time horizons by means of event study methodology. The results show that market reaction is rather positive immediately before the announcement release and negative over the following six-day-period starting on the event day. A possible explanation for this phenomenon is suggested. Besides the traditional examination of abnormal return behaviour, we also check whether or not resignation announcements induce increases in the variance of stock returns over the period under consideration. It turns out that a tendency towards increased stock return volatility can be observed in the whole period prior to the announcement release.

Key Words: managerial resignations, abnormal returns, event-induced variance, emerging stock market
JEL *Classification:* G14; C22

Introduction

Stock price reactions to announcements of managerial resignations have been investigated by many researchers. Part of this research focuses on forced resignations. Forced resignations are relatively rare and are due more often to external factors like blockholder pressure or takeover attempts, than to normal internal monitoring. According to economic theory internal control mechanisms are effective if there are more changes of top management in poorly performing firms than in firms whose performance is good. Moreover improvements can be observed in firms' performance after top management changes. In general, identifying forced

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departures is difficult, because press reports do not describe them as such. Sometimes e. g. a departure announced as a retirement may be in reality a forced resignation.

However, if a newspaper release states that a resignation is forced, or that it results from the poor performance of a company, a researcher can take it for granted that the change is really forced. In order to build a data set of forced departures, one has to identify the properties of forced resignations. Then resignations which share these properties can be classified as forced resignations even if those are not announced as such. The interpretation of event study effects of a resignation is not easy; a management change may signal different things: that a firm's performance is worse than expected, or that a firm's performance will improve as a result of the management change but also that the firm is considered as a takeover target. In addition, top management changes can be probably partially anticipated by taking into account poor performance before the change.

Based on the forced managerial turnover data from the US stock market, Furtado and Rozeff (1987) found increases in stock prices due to the event, but from a statistical point of view this result was insignificant. Unlike Furtado and Rozeff (1987), Worell, Davidson, and Glascock (1993) documented a statistically significant price increase of 2.3%. A very interesting work is that of Weisbach (1988), who reported that, on the one hand, there is no price impact if the managerial resignation takes place in a company whose board is dominated by executive directors. On the other hand, there is a significant positive stock price reaction if the majority of the board consists of external, independent directors.

Khanna and Poulsen (1995) examine whether management turnover leads to improvement in firms' performance. They argue that removing poorly performing managers is an important step toward maximizing shareholder wealth. A management board must identify poor management and attract superior replacement managers. This is the main criterion of the effectiveness of internal monitoring. However a negative correlation between prior stock price trends and managements turnover may coexist with effective internal board monitoring. Khanna and Poulsen supply two alternative explanations. The first one is that managers of poorly performing companies may voluntarily resign in order to avoid shareholder lawsuits. The second one is that company boards may replace the managers of poorly performing firms even if those managers are not responsible for the bad financial situation of

a company. Under neither of these two scenarios would a change in management necessarily be expected to induce improvements in performance.

In contrast to the above-mentioned results, Warner, Watts, and Wruck (1988) provide empirical evidence of negative market reaction to forced managerial resignations. A possible reason for this is, according to Warner, Watts, and Wruck, the fact that the announcement of a forced resignation is interpreted as a signal of worse current and future firm's performance. This finding was later confirmed by Mahajan and Lummer (1993), who also documented a significant negative reaction over a two-day-period, starting one day before the announcement release.

The second very important topic of research is non-conflictual resignations and their impact on stock prices (see e. g. Mahajan and Lummer 1993). The conclusion that can be drawn from these studies is that the announcements of resignations on a non-conflictual basis are accompanied by a decline in stock prices. This means that such announcements are interpreted by market participants as a loss of valuable human capital by a firm. Resignations due to the retirement by managers need to be analysed separately from other non-conflictual resignations. The latter can usually be well anticipated, and as a consequence, no stock price reaction should be observed. The empirical work of Weisbach (1988) and Mahajan and Lummer (1993) provides support for this statement. In addition, forced resignations and normal retirements also exhibit a significant amount of post turnover corporate asset-restructuring sales, layoffs, cost-cutting measures and so on.

In this paper we provide an empirical analysis of announcements about the resignation of board members which took place in the companies listed on the primary market of the Warsaw Stock Exchange (WSE). Poland is a representative case for event study in an emerging stock market due to the Polish experience in the establishment and development of a stock market. The stock market in Poland did not exist, practically, until the beginning of 1990s. The WSE, the only stock exchange in Poland, became operational in April 1991. Despite the fact that the period under consideration is relatively short and comprises only five years, our results reveal a statistically significant stock price reaction to announcements of resignations. To be more precise, market reaction is rather positive immediately before the announcement release, and negative over the following six-day-period, starting on the event day. Besides a traditional examination of abnormal return behaviour, we also check whether or

not resignation announcements induce increases in the variance of stock returns over the period under consideration. It turns out that an increasing tendency towards stock return volatility can be observed during the period prior to an announcement release.

The rest of the paper proceeds as follows. The second section outlines the methodology that aims at uncovering the anomalous behaviour of stock prices induced by an event. The third contains a brief description of the data and the rules underlying sample selection procedure. In the fourth section we start with some basic descriptive analysis of the abnormal return series, and then the test results for the significance of an event effect over the period under consideration are presented. The last Section provides a summary of the main findings, comments and some guidelines for future research.

Methodology

Over thirty years ago Fama, Fisher, Jensen, and Roll (1969) introduced event study methodology which still seems an unbeatable tool for uncovering stock price as well as trading volume reactions to the arrival of new information. Obviously, the methods that are used now under event study differ from those of Fama et al. but the main idea has remained the same over the whole period since this methodology was introduced.

Let Π be the set of day indices t belonging to an event window, and Ω be a set of day indices t which are attributed to a pre-event or observation window. As a first step, stock prices (P_t) are transformed into returns (R_t) by means of a discreet or continuous formula. The latter, which is given by

$$R_t = \log\left(\frac{P_t}{P_{t-1}}\right), \forall t \in \Pi \cup \Omega, \tag{1}$$

is especially popular due to the well-known fact that return series (1) is better approximated by normal. In addition, the use of a continuous formula usually improves the stationarity properties of the return series (stabilizing the stock return variance with respect to time).

As a second step, the abnormal return series (AR_t) is obtained by subtracting the actual return from the expected return

$$AR_t = R_t - E[R_t|R_{k\in\Omega}], \forall t \in \Pi. \tag{2}$$

Note that the expected return in (2) is conditional on the returns observed over the pre-event window. The most popular model for generating expected returns is the market model (MM) introduced by Sharpe

(1963). This model shows the expected return as the sum of two components. The former is a constant (α). The latter, is a product of the systematic-risk parameter and the market-portfolio return (βR_m). With MM serving as an expected return model, (2) may be rewritten as

$$AR_t = R_t - \hat{\alpha} - \hat{\beta} R_{m,t}, \forall t \in \Pi, \tag{3}$$

where $\hat{\alpha}$ and $\hat{\beta}$ mean the estimators of the corresponding model parameters applied over the pre-event window.

In order to check whether the average abnormal return on a given day $t \in \Pi$ statistically differs from zero the t-statistic is employed, which is given by

$$t_{stat} = \frac{N^{-1} \sum_{i=1}^{N} AR_{i,t}}{\hat{\sigma}_{AAR}}, \tag{4}$$

where N stands for the number of firms included in the sample and the denominator (the standard deviation of the average abnormal returns) can be calculated as follows

$$\hat{\sigma}_{AAR} = N^{-1} \left[\frac{1}{\bar{\bar{\Omega}} - 1} \sum_{t \in \Omega} \left(\sum_{i=1}^{N} AR_{i,t} - \frac{1}{\bar{\bar{\Omega}}} \sum_{t \in \Omega} \sum_{i=1}^{N} AR_{i,t} \right)^2 \right]^{\frac{1}{2}}, \tag{5}$$

where $\bar{\bar{\Omega}}$ means a cardinal number of set Ω.

With the widely-documented fact that financial time series exhibit heteroscedasticity of variance, the use of a market model as in (3) does not seem to be fully justified. The estimator of the standard deviation of the average abnormal returns defined by (5) is not able to capture variance changes which may occur over the event window. As a consequence, the value of statistic (4) is no longer sufficient for the purpose of inference needs.

To relax the assumption that stock return variance remains the same on each day of the event window, while improving the statistical inference used under event study, has resulted in the development of several helpful techniques. One of them is that of Hilliard and Savickas (2000). An original test for abnormal performance is proposed by Hilliard and Savickas with the market model and the GARCH(1,1) error term. Under this study we, however, decided to use the generalized ARMA(r,m)-MM-GARCH(p,q) model given by

$$R_{i,t} = \Phi_{i,0} + \sum_{j=1}^{r} \Phi_{i,j} R_{t-j} + \beta_i R_{m,t} + \varepsilon_{i,t} + \sum_{j=1}^{m} \Theta_{i,j} \varepsilon_{i,t-j}, \quad \varepsilon_{i,t} \sim (0, h_{i,t}).$$

$$h_{i,t} = \alpha_{i,0} + \sum_{j=1}^{q} \alpha_{i,j}\varepsilon_{t-j}^2 + \sum_{j=1}^{p} \omega_{i,j} h_{t-j}. \tag{6}$$

The proper length of time-lags in the model is identified using the Akaike Information Criterion. The model parameters are estimated by means of the ML-method from observations included within the pre-event window, i. e. for $t \in \Omega$.

The test statistic (l_t) can be expressed as

$$l_t = \frac{ASR_t}{\sqrt{\sum_{i=l}^{N}(SR_{i,t} - ASR_t)^2}}(N-1), \tag{7}$$

where $SR_{i,t} = AR_{i,t}\sqrt{1/\hat{h}_{i,t}}$ and $ASR_t = N^{-1}\sum_{i=1}^{N} SR_{i,t}$.

In order to test the implications of announcements over any sub-period of the event window whose boundaries are set as m and s ($m < s$), the standardized cumulative abnormal return can be calculated

$$SCAR_{i,m,s} = \frac{\sum_{t=m}^{s} AR_{i,t}}{\sqrt{\sum_{t=m}^{s} \hat{h}_{i,t}}}. \tag{8}$$

The corresponding test statistics are given by

$$l_{m,s}^{CAR} = ASCAR_{m,s}\sqrt{\frac{N(N-1)}{\sum_{i=1}^{N}(SCAR_{i,m,s} - ASCAR_{m,s})^2}}, \tag{9}$$

where $ASCAR_{m,s} = N^{-1}\sum_{i=1}^{N} SCAR_{i,m,s}$.

With the help of the methodology proposed by Hilliard and Savickas (2002) we are also able to study the event effect on the unsystematic volatility of stock returns. The multiplicative abnormal volatility parameter (λ), introduced by the above-mentioned authors, measures the scale of the increase in unsystematic volatility, caused by an event. This parameter is defined as

$$\hat{\lambda}_t = (N-1)^{-1}\sum_{i=1}^{N} \frac{\left(AR_{i,t} - N^{-1}\sum_{k=1}^{N} AR_{k,t}\right)^2}{N^{-1}(n-2)\hat{h}_{i,t} + N^{-2}\sum_{k=1}^{N}\hat{h}_{k,t}}. \tag{10}$$

Note that if parameter (10) is equal to unity, the event has no impact on unsystematic volatility. A value of the parameter greater than one implies a volatility increase due to the event. To test it more formally, one can use a statistic expressed as

$$S_t = (N-1)\hat{\lambda}_t, \tag{11}$$

which is a chi-squared distribution with $N-1$ degree of freedom.

Analogically, to check the same for a given sub-period of the event window statistic (11) may be modified as follows

$$CS_{m,s} = (N-1)\sum_{t=m}^{s}\hat{\lambda}_t. \tag{12}$$

This statistic also has a chi-squared distribution with $(N-1)(s-m+1)$ degree of freedom.

Sample Description

Our sample consists of announcements of board member resignations collected from the online database constructed by Parkiet from articles and news published, among others, by Parkiet Newsroom, PAP and Reuters. The number of items included in this database exceeds 400,000. Therefore, we first searched the database for announcements of interest using several different keywords. Afterwards, each of the filtered announcements was read carefully in order to make sure that the information conveyed by the announcement was clear enough and met our selection requirements (we talk about them in more detail below).

One important problem when addressing managerial resignations stems from the fact that the true motives underlying a resignation decision are not always given. As a result, the boundary between forced and non-conflictual resignations is rather vague. To ensure that our sample consisted only of informative managerial resignations, we left out any resignation as a consequence of retirements by the managers if it took place at the normal retirement age, or at the expiry of a contract.

The period of study was from January 2000 to June 2005, and the companies which we took into account were those which are listed on the primary market of the WSE. There are all together sixty announcements of board member resignation that satisfied two major selection criteria. Firstly, the use of event study methodology made it necessary to identify an unambiguous event date for the resignation decision. This event date is, under this study, the day on which such a decision is first announced to the public. As a consequence, all news that only repeated the same information has been not taken into account. Secondly, the event must be adequately isolated, so the chosen eleven-day-period (the event window) centred on the event day ($t = 0$) should not be affected by any other firm-related events (confounding events). This made it necessary to exclude from the sample all those announcements that took place at the same time as other firm-related events.

The stock price data were provided by Parkiet, which compiles a database on the Polish stock market. Based on these data we obtain daily return series for each stock included in our sample, and the return on the stock index WIG which is a market-capitalization stock index, weighted and adjusted for cash dividends.

Empirical Results

ABNORMAL RETURN

We start our investigation with some basic descriptive analysis and a simple test of abnormal returns over the event window. First, for each event included in the sample market model parameters (α and β) were estimated on the basis of the return series from a two-hundred-day-period, ending on the sixth day before the event day ($t = 0$). Then, abnormal returns (3) were computed. The descriptive statistics for the abnormal returns as well as the t-statistic (4) are reported in table 1.

The sample mean abnormal return is rather erratic in terms of both sign and size over the event window. It ranges from –1.068% on the third day after the announcement release to 1.507% two days before that day. It is also worth emphasizing that over the sub-period prior to the event day the mean abnormal return reveals a trend towards positive values, while after the announcement release one can observe rather the reverse tendency. The minimum and maximum values of abnormal returns show huge variability of event effect across the firms included in the sample. The high values of the sample standard deviation of abnormal returns appears to confirm that information about managerial resignation diversely affected stock prices across the sample. In the whole event window, on the other hand, the sample standard deviation is fairly stable and ranges from 2.9% (for $t = -1$) to 7.4% (for $t = 2$). Finally, the abnormal return series display excess kurtosis and are skewed to the left, except for three cases ($t = -2, +1, +4$) where the skewness is positive. In all days within the event window, except for the last one the kurtosis is substantially larger than 3, but again one can notice that the largest values are observed over the second part of the event window (from $t = 0$ to $t = +4$).

With regard to the t-Student statistic, we observe a statistically significant value in three cases. The first time when the test statistic is different from zero, at a 1% level of significance, is two days before the announcement release. The corresponding mean abnormal return is positive and equals 1.51%. The two other cases where one can identify a sig-

TABLE 1 Descriptive and *t*-Student statistic of abnormal returns within the event window

Day *t*	Descriptive statistics						*t*-statistic
	Minimum (%)	Mean (%)	Maximum (%)	Std. dev. (%)	Skew-ness	Ex-kurtosis	
−5	−11.002	−0.595	11.071	4.095	−0.165	1.960	−1.165
−4	−23.079	0.042	13.952	5.549	−1.469	7.628	0.083
−3	−21.384	−0.547	13.304	4.619	−2.030	9.642	−1.070
−2	−6.521	1.507	20.019	5.025	2.040	4.593	2.950**
−1	−11.547	0.056	7.410	2.914	−1.250	5.042	0.110
0	−40.155	−1.006	9.714	6.678	−3.770	20.285	−1.969*
+1	−20.368	0.164	27.007	5.171	1.349	15.442	0.321
+2	−42.658	−0.184	20.254	7.404	−2.906	19.460	−0.361
+3	−41.490	−1.068	10.603	6.296	−4.508	29.276	−2.089*
+4	−8.602	0.757	35.096	5.725	3.776	21.733	1.482
+5	−9.208	−0.824	5.275	3.232	−0.663	−0.021	−1.613

NOTES ** Statistically significant value at 1% level, * stat. significant value at 5% level.

nificant event effect include the event day itself and the third day after that day. In both of them the mean abnormal return is negative and, respectively, amounts to –1.01% and –1.07%. It can be concluded from the figures that managerial resignation announcements cause stock prices to increase immediately before the official announcement, but then stock prices start to fall. Further, the decrease in stock prices not only completely cancels the previous increase, but also continues below the price level which could be assumed under non-event conditions.

The use of the market model as in (3) produces only a rough approximation of the true event effect due to the assumptions underlying the OLS method of estimation of model parameters, including homoscedasticity and non-correlation of the error term. It is a well-documented fact that stock return series exhibit time-varying variance and are usually auto-correlated. In this context the promising nature of a GARCH approach is obvious.

Therefore, as a second stage, we estimated the model (6), using the same estimation window as previously for the market model. After controlling for model misspecifications, we continue to evaluate event effects associated with managerial resignations by obtaining the standardized abnormal return series, and then by calculating the standardized cumu-

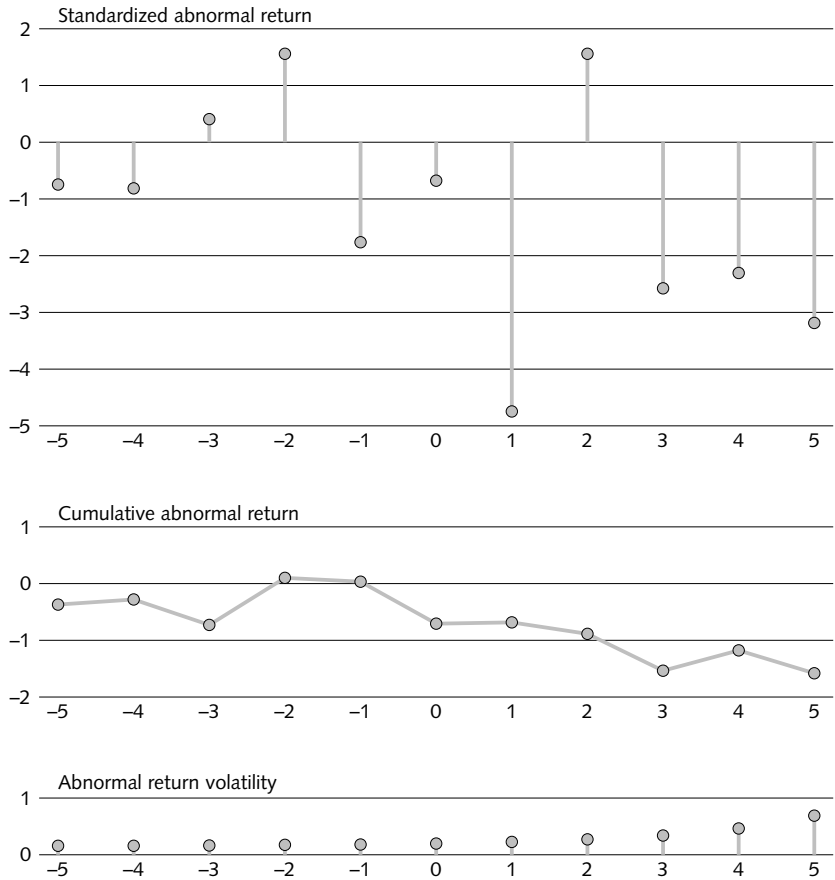

FIGURE 1 Abnormal returns and volatility within the event window (GARCH approach)

lative abnormal return (8) as well as the corresponding test statistic (9) over the seven periods of the event window.

Figure 1 presents the standardized abnormal returns, cumulative abnormal returns and conditional volatility generated by means of the model (6) over the event window. Taking the variance of stock returns into consideration does not change fundamentally our inferences about abnormal return behaviour in the whole event window. Again one can find that negative standardized abnormal returns are generally distributed in the second half of the event window (for $t \geq 0$). The shape of the line representing cumulative abnormal return fully supports this finding. As regards the conditional volatility of stock returns, one can

TABLE 2 Test results for event effect within sub-periods of the event window

	Time interval $\{m,s\}$						
	{–5,–1}	{–3,–1}	{–2,–1}	{0,+2}	{0,+3}	{0,+5}	{–5,+5}
$ASCAR_{m,s}$	0.033	0.729	1.564*	–1.781	–3.126**	–3.229**	–3.196
$I^{CAR}_{m,s}$	0.017	0.602	1.932	–1.598	–2.347	–2.093	–1.170

NOTES ** Statistically significant value at 5% level, * stat. significant value at 10% level.

notice a slow rise in variance in the second half of the event window. This observation, however, is not equivalent to saying that an event-induced shift in variance can be identified. We address this issue in the next section.

Table 2 reports the test results for the event effect in the seven different periods of the even window. Statistically significant values of average standardized cumulative abnormal returns (ASCAR) can be found in the case of three sub-periods of the event window, including the period from day $t-2$ to day $t-1$, from the event day to day $t+3$, and finally from the event day to the last day within the window. In the whole event window the ASCAR is negative (–3.196), but its value does not differ from zero from a statistical point of view.

What can be concluded from the figures in table 2? Firstly, the negative valuation effect in the second half of the event window clearly indicates that companies, on average, lost valuable human capital because of the resignation of board members. This finding is consistent with our intuition and corroborates other empirical evidence, e. g. that of Mahajan and Lummer (1993). Secondly, the positive valuation effect before the official announcement of managerial resignations may be, on the other hand, interpreted as evidence that a resignation results in conflict reduction inside the company, as a consequence of which stock prices start to increase.

One possible explanation for this phenomenon is that prior to an official announcement about a resignation there is trading by insiders. Insiders are well informed and probably know the true circumstances of a resignation decision. They may be convinced that the resignation of a given person will ultimately lead to improved performance. After the official announcement other investors start to trade. They are not as well informed as insiders and have to guess the true reasons for a resignation. From their view-point a resignation means a loss of the firm's human capital.

TABLE 3 Test results for cumulative abnormal volatility within sub-periods of the event window

	Time interval $\{m,s\}$						
	$\{-5,-1\}$	$\{-3,-1\}$	$\{-2,-1\}$	$\{0,+2\}$	$\{0,+3\}$	$\{0,+5\}$	$\{-5,+5\}$
$\sum_{t=m}^{s} \hat{\lambda}_t$	13.485*	5.229*	2.934*	0.931	0.968	0.977	14.462*
$CS_{m,s}x^{10}$	68.776	26.670	14.964	4.779	4.934	4.983	73.758

NOTES * Statistically significant value at 10% level.

TESTING FOR THE EVENT EFFECT ON THE UNSYSTEMATIC VOLATILITY

Finally, for the same periods of the event window as previously, we calculate the multiplicative abnormal volatility parameter (10) and the corresponding test statistic (12). The results are summarized in table 3.

We found an increasing tendency towards volatility in the cumulative abnormal returns over the first half of the event window (i. e. for $t < 0$). In the second half of the window (i. e. for $t \geq 0$) volatility is not changed. This can be seen as evidence that before the information about a resignation becomes public the market reacts more nervously. The volatility increase here may be a result of uncertainty about the possible resignation.

Conclusions

The purpose of this paper is to analyse whether the announcement of resignations of board members conveys valuable information in an emerging stock market like the Polish one. Using a variant of event study methodology, we provide empirical evidence supporting the hypothesis of market reaction to managerial resignations. Before the announcement release there is a tendency towards an increase in stock prices. When the firm announces the resignation of members of the board, this tendency is reversed, and stock prices start to fall.

In order to explain this phenomenon we have referred to differences in the interpretation of a resignation announcement by insiders and other investors operating on the WSE. Insiders, who know the true motives behind a resignation decision, are prone to buy shares. It may be they expect that a resignation, by reducing conflict and/or improving management, will result in better firm performance. With the limited information in an official announcement, other market participants have to guess what the resignation means for the current and future position of

TABLE 4 Companies included in the sample and the number of identified events

Name of company	*n*	Name of company	*n*
4media	2	Naftobudowa	3
7bulls.com	1	Netia	1
Agora	1	Optimus	1
Agros	1	Orfe	2
Amica Wronki	1	Pekao	2
Apexim	1	Pfleiderer Grajewo	1
Bank Millennium	3	Pollena Ewa	1
Bre Bank	2	PPWK	1
Centrozap	2	Projprzem	1
Comarch	2	Prokom Software	3
Elektrim	1	Redan	1
Energomontaż-P.	1	Softbank	2
Espebepe	1	Ster-Projekt	3
Ferrum	1	Szeptel	1
Fortis Bank Polska	1	TIM	1
Getin	1	Tonsil	1
Impel	1	Tras Tychy	1
Interia.pl	1	Wólczanka	2
Kruszwica	1	ZM Duda	1
Leta	1	ZPC Mieszko	1
Mostostal Zabrze	2	ZPUE	1
Mostostal-Export	1		

NOTES *n* – the number of events.

a firm. As our results show, resignations are regarded as a loss of valuable human capital. Hence, stock prices tend to go down over the period following the announcement.

It would be very interesting to check whether stock prices react differently to forced and non-conflictual resignations (e. g. normal retirement). It would be also interesting to find out the relative importance of different factors which cause forced resignations, such as blockholder pressure, takeover attempts, financial distress, shareholder lawsuits or normal board monitoring. With the meagre sample, we cannot do so under this study. Therefore, we must leave this problem for future research.

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