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Institutional Investors and the Information Content of Earnings Announcements: The Case of Poland*

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Abstract: This paper investigates the relationship between market reaction to earnings surprises and institutional concentration in the firm's shareholders base. We use data from the Polish stock market where pension funds form a homogenous and highly competitive investor class with an increasing share in the market capitalisation and trading volume. We find evidence that higher pension funds holdings in a company tend to reduce the magnitude of market reaction around public disclosures. We interpret these findings as an information advantage that funds have over individual investors, which may result from scale economies in gathering and processing public information, as well as from access to privileged information in the interim period. We also find that company managers are selective as to the type of information they provide to the market prior to their scheduled disclosures.

JEL Classification: G14, G23, M41

Keywords: public disclosure, information advantage, institutional investors

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1. Introduction

This paper stems from two broad streams of finance and accounting literature. The first one investigates the role of institutional investors in security markets and was initiated by the well documented growth in institutional ownership (see for example, Gompers and Metrick, 2001). The second stream investigates the information content of accounting disclosures which has triggered a vivid discussion on the topic since Beaver's (1968) seminal paper on market reaction to earnings announcements. We investigate the relation between institutional ownership and the information content of earnings surprises using data from the Polish stock market. We investigate whether price, volatility, and volume reactions during the earnings announcement windows are correlated with pension funds' stake in a company.

Institutional investors, as a group, can benefit from economies of scale and, consequently, can be more efficient in processing information. Hakansson (1977) develops a model with several investor groups which differ in their ability and/or their resources to conduct fruitful search for information. Investors with unusual detective abilities and large resources can benefit from undisclosed interim information, while investors with low detective skills and/or limited resources rely solely on public information. According to Lev (1988), economies of scale play a major role in the value of information. Acquisition and processing of information may not be economically justifiable at low levels of investment, whereas becoming informed is profitable when the scale of investment activities is large.

Information advantage of institutions may also arise from selective disclosure of important information by public companies to securities market professionals and certain institutional investors before making full disclosure to the public. This practice by the U.S. companies was the source of concern for the Securities and Exchange Commission, which adopted new rules to address the issue in October 2000. According to Regulation Fair Disclosure (Reg FD), if a company discloses nonpublic information to any person, it should also make a public disclosure of this information.

Competition in the asset management industry can create pressure to improve performance and achieve higher returns through searching for private information. It is also conceivable that institutions have access to the same amount of information as the public, but they are able to process it more efficiently. This information advantage preempts the content of scheduled earnings announcements and the funds trading incorporates the pertinent information into asset prices before it is reflected in earnings innovations. Consequently, one can expect the magnitude of market reaction to the announcement to be decreasing with the level of institutional ownership in a firm.

Previous studies on the U.S. market provide mixed evidence on the role of institutional shareholders in the market impact of earnings surprises. El-Gazzar (1998) finds that price reaction around earnings announcement is inversely related to the institutional investors' ownership level in a firm. El-Gazzar interprets this evidence as supportive of the hypothesis that institutions have a strong incentive to search for private predisclosure information and induce a higher level of voluntary interim disclosure. El-Gazzar's findings are corroborated by Ayers and Freeman (2003) who find that stock prices of firms with high institutional ownership incorporate earnings information earlier than the prices of firms with low institutional ownership. On the other hand, Potter (1992) finds a positive association between institutional ownership and stock price variability around earnings disclosure. Potter concludes that the alternative information collected by institutional investors does not preempt that conveyed by earnings announcements. The results of Potter's study are supported by Hotchkiss and Strickland (2003) for negative earnings announcements, who additionally investigate the volume reaction around the announcements and find that the reaction is greater for companies with higher institutional ownership.

The Polish stock market, due to its unique institutional setting and investor composition creates new research opportunities to investigate the relationship between institutional ownership and the market reaction to earnings news. Polish pension funds,

established in 1999 within a comprehensive pension system reform, constitute a homogenous and highly competitive investor group, which accounts for about 20% of the free float on the Warsaw Stock Exchange. Their functioning is strictly regulated, furthermore, the legal investment limits induce similar behaviour on the part of the fund managers. This homogeneity enables us to overcome an issue noted by Hotchkiss and Strickland (2003) and Dennis and Strickland (2002), who find that different types of institutions have different characteristics, which in turn dictate their trading behaviour and thus their impact on market. Moreover, strong competition among pension funds is implied by a minimum required rate of return, which is set every quarter by the Insurance and Pension Funds Supervisory Commission (KNUiFE).

Given the unique institutional setting in Poland, and considering the homogeneity of Polish funds, our first hypothesis is whether pension fund managers in Poland have any information advantage over the general trading public. This test, therefore, provides new insights into the importance of information for different classes of equity investors in Eastern European markets. The previous findings from the U.S. market might not apply to continental Europe due to the differences in institutional settings. The US security markets are the most developed and sophisticated in the world and substantial amount of resources are spent on investment analysis and research. Furthermore, the US accounting system is primarily designed to satisfy the information needs of current and prospective shareholders. Regulations in the newly established Eastern European markets, like the Germanic model, are designed for a wider group of stakeholders other than capital market investors. This design limits the scope and clarity of freely available knowledge about companies and subsequently increases the importance of expertise to collect and process information. These institutional differences make Eastern European funds more significant traders and their trading behavior more informative in the market place.

If fund managers in Poland are shown to have superior information relative to small and disorganized individual traders, as El- Gazzar (1998) and Ayers and Freeman (2003) find for the US, another interesting question arises. What is the nature of pension funds managers' informational advantage? Do Polish funds use Hakansson's (1977) resource and expertise advantage or Lev's (1988) economies of scale to acquire public information and process it more efficiently than the small trader can? Or is it that competitive pressures force them to acquire the level and type of information that is not generally or immediately available to the public? This possibility is, at least theoretically, conceivable in Eastern Europe. In the Polish setting, even though insider trading and disclosure laws generally follow western standards, the law enforcement is not as meticulous. Polish regulations prohibit disclosure of material information undisclosed to the public and ad-hoc information disclosure requirements obligate companies to promptly release to the public any information that may substantially affect the stock price (similar to German regulations). However, given the recent nature of FD regulations, the laws may not be current enough for modern practices and enforcement may not be sufficient.

Thus our second hypothesis is whether the Polish fund managers have access to more information than the public prior to the public announcement of earnings, or are they just more sophisticated in processing the same information.

The paper proceeds as follows. Section 2 outlines the characteristics of the Polish stock market and presents pension funds as an important investor group in Poland. The data and methodology are described in Section 3. Section 4 follows with the empirical findings on the relation between the market reaction to earnings announcements and pension funds holdings, and section 5 concludes the paper.

2. Polish Stock Market and Pension System Reform

The stock market in Poland was re-established at the beginning of the 1990's and the Warsaw Stock Exchange (WSE) developed to become the largest exchange in Central and Eastern Europe, with the market capitalisation of USD 28.8 billion in December 2002. Although the market has drawn substantial interest from foreign investors, domestic individual investors were the most active market participants during the 90's (WSE, 2003). The introduction of a comprehensive social security reform package on January 1, 1999 was a milestone for the market. Closely following the Chilean model, the state-administrated scheme based on a pay-as-you-go retirement system was enriched with an investment-based component of individual retirement accounts set up with privately owned pension funds, which invest on the stock and bond market. Under the new system, employees are obligated to invest 7.3% of their pre-tax income in a professionally managed mutual-fund style company of their choice. 21 funds got required licences and started operating in 1999 and their number has decreased to 17 since then, due to the on-going consolidation.

The government imposed legal regulations and supervision to ensure safety and effectiveness of the funds' investments and the Insurance and Pension Funds Supervisory Commission (KNUiFE) was established as a supervisory body. The detailed regulations include investment limits and a mandatory minimum rate of return. Investments in listed shares are limited to 40 percent of the funds' assets, and additionally a certain level of portfolio diversification is required. KNUiFE defines a minimum rate of return on pension funds based on the ex-post funds performance in the prior 24 months on a rolling basis every quarter. This minimum acceptable performance rate is the lower of $\frac{1}{2}$ of the mean pension funds rate of return over the two-year window or 400 basis points below this mean. If a fund falls below the threshold, the managing company has to cover the difference from its own resources.

On the one hand, the Polish pension fund regulations imply similar investment strategies across funds since each fund is obligated to follow certain portfolio management guidelines. On the other hand, the pressure to avoid falling below the minimum rate of return and to increase income by attracting new clients creates financial incentives to constantly improve performance. Consequently, fund managers seek information which would give them an advantage over competition. They may also want to actively monitor companies held in their portfolios and attempt to exert control over the management of these companies to enforce shareholder value maximizing behaviour.

The funds' stock holdings accounted for 0.5% of the WSE capitalisation at the end of 1999, but over a short period of time they have grown to become the biggest portfolio investors on the Warsaw Stock Exchange. By June 2002, the pension funds share in the stock exchange capitalisation increased to 6.5%. For comparison, according to *Analyze Online*, a Polish company monitoring the market, foreign investment funds accounted for 3.8% and Polish investment funds for 1.3% of the market capitalisation at the time. Due to a high share of long-term investors who are unlikely to trade actively, the pension funds' share in the free float is estimated to be about as high as 20%. These long-term investors are usually foreign companies which bought large stakes in privatised Polish companies or founders of family firms which have gone public¹.

The pension funds' share in trading volume is difficult to estimate. The limited free float leads us to suspect that the funds' share in trading is much higher than indicated by their nominal share in the capitalisation. The results of a survey conducted by the WSE among brokerage houses provide evidence that domestic institutional investors, a group dominated

¹ For example, France Telecom controls over 30% of shares of Telekomunikacja Polska, the largest company on the WSE; and UniCredito Italiano holds over 50% of the stock of Pekao, the largest listed bank. The share of long-term investors in the WSE capitalisation is estimated to be about 58%, and additional 8% are held by the state (Karpinski, 2002).

by pension funds, made up 36% of trading in 2002 (WSE, 2003). KNUiFE estimates that on the vast majority of trading days in 2000 pension funds's share of total trading ranged between 10 and 30% (KNUiFE, 2001). Considering the increase in the funds' holdings and the decline in total trading since 2000, as reported in Table 1, we can conjecture that pension funds account for a much larger share of equity trading now.

[Table 1 around here]

Table 1 summarises the preliminary data on pension funds' holdings in relation to the characteristics of the Warsaw Stock Exchange. The upward trend in aggregated holdings over the period (from 0.5% in 1999 to 6.5% of the stock market capitalisation in 2002) was accompanied by the increasing number of stocks in the funds' portfolios. At the beginning of operation, the funds concentrated on the largest stocks on the exchange, and then expanded their scope of interest to medium-sized shares. This is reflected in decreasing mean and median capitalisation of held companies, which fell from PLN 1,643.7 mil and 301.7 mil in December 1999 to 915.2 mil and 119.1 mil, respectively, in June 2002. The funds ownership spans less than half of the listed companies, apparently neglecting small-cap firms. This is conceivably caused by limited liquidity of small companies which creates substantial investment barriers and increases risk. Besides, fund managers tend to buy stocks with higher growth opportunities rather than value stocks, as indicated by market-to-book ratio greater than the market average. The funds controlled, on average, 1.6% of the shares outstanding in held companies at the end of 1999. This percentage rose to 8.3% in 2001.

3. Data and Methodology

The sample consists of stocks listed on the Warsaw Stock Exchange in the period 1999-2002 for which the I/B/E/S data on earnings forecasts and actual earnings for at least

one year was available. As for other small markets, I/B/E/S provides only annual earnings forecasts for Polish companies. The WSE provided daily closing prices and trading volumes, as well as stock indices, dividends, market capitalisation and market-to-book data. The announcement dates were collected from the Emitent Information System, which is officially used by Polish public companies for news dissemination. The system was searched for fourth quarter earnings announcements since they convey information on a company's annual earnings. This date was used as the announcement date for the (annual) earnings announcement. The data on pension funds holdings come from annual reports obtained from fund managers. The final sample includes 124 earnings announcements of 56 companies. There are 53, 43 and 28 announcements of 1999, 2000 and 2001 earnings, respectively.

The earnings forecast error or surprise, FE , is calculated for every announcement as the difference between the actual earnings and the median forecast from the month prior to the announcement. We scaled the forecast errors by the stock price two days prior to the announcement. Actual earnings above the consensus forecasts are called positive forecast errors. Inversely a negative forecast error is defined as the actual earnings that fell short of the median forecast. To control for the magnitude of the forecast error or surprise (regardless of its direction), a variable $ABSFE$ is introduced, which is the absolute value of FE .

Pension funds holding in a company, PFH , is measured as a percentage of shares outstanding held by the funds at the beginning of a calendar year. The natural logarithm of a firm's market capitalisation, $SIZE$, and a market-to-book ratio, MB , are calculated two days prior to the announcement. $NOEST$ is the number of earnings forecasts (or analysts) on the I/B/E/S tape for a given company in the month prior to the earnings disclosure.

We employ three reaction metrics: abnormal returns, abnormal return volatility and abnormal trading volume. Return-based measures are typically used in the literature to capture the valuation impact of an event, while the volume metric indicates the extent to which the event directly affects trading decisions (Cready and Hurtt, 2002). Bamber and Cheon (1995)

note that even though price and volume metrics are correlated, they convey different information and should be examined together in the information-content oriented research. Price changes reflect average changes in investors' beliefs, while in contrast, trading volume is the aggregate investors' reaction to the announcement (Beaver, 1968; Kim and Verrecchia, 1991).

The stock price reaction to the earnings announcement is measured by means of the standard event study methodology. The market model is estimated for every announcement on the basis of the daily log returns during the 120-day pre-listing period from day -150 to day -31 relative to the event day. The WIG index is used as a proxy for the market portfolio. The WIG is a value-weighted, total return index, which covers companies that account for 99% of the WSE capitalisation. Abnormal returns for stocks are calculated for each day during $t-30$ to $t+30$ period as:

$$AR_{it} = R_{it} - [a_i + b_i R_{mt}] \quad (1)$$

where AR_{it} is company i 's abnormal return on day t , R_{it} and R_{mt} denote the day t dividend and split adjusted returns on company i and the market index, respectively. a_i and b_i are the parameters of the market model for company i . Daily abnormal returns are averaged across positive and negative surprises and cumulated for various windows. This way, we can observe the price behaviour prior and after the event, as well as on days surrounding the announcement.

We run the following price-earnings response regressions:

$$CAR(p, q)_i = b_0 + b_1 * HPFH_i * FE_i + b_2 * LPFH_i * FE_i + e_i \quad (2)$$

where $CAR(p, q)$ is cumulative abnormal return over the window running from day p to day q relative to the announcement date and FE is the forecast error. $HPFH$ is a dummy that takes the value of one when pension funds holding is above its sample median, and zero otherwise. Likewise, $LPFH$ is a dummy representing the effect of low pension funds holding. This model

is designed to capture the differential market reaction to earnings surprises for stocks with low and high *PFH*. \mathbf{b}_1 (\mathbf{b}_2) is the Earnings Response Coefficient for companies with high (low) pension funds holdings. A significant and negative $\mathbf{b}_1 - \mathbf{b}_2$ would indicate that, all else the same, companies with a higher percentage of shares controlled by pension funds react less strongly to earnings surprises. We run this model for several event windows, namely: (-30, -6), (-5, -1), (0, 1), (0, 5), and (6, 30).

Following Landsman and Maydew (2002) and Hotchkiss and Strickland (2003), we define abnormal volatility for the company i 's return on day t in the following way:

$$AVAR_{it} = AR_{it}^2 / \mathbf{s}_i^2, \quad (3)$$

where AR_{it} is a market model adjusted return of company i on day t and \mathbf{s}_i^2 is the variance of company i 's market model residuals estimated over days -150 to -31 relative to the announcement day. If the volatility on a given day does not differ from the normal volatility, i.e. the return variance in the estimation period, $AVAR_{it}$ equals one. The value of the metric greater than one denotes the volatility greater than normal. The metrics we use in the study, $AVAR01$ and $AVAR05$ are abnormal volatilities cumulated over days 0 and 1, and 0 through 5 relative to the earnings announcement day, respectively. Under the hypothesis of normal volatility, $AVAR01$ and $AVAR05$ equal 2 and 6, respectively.

We define abnormal volume of trading in company i 's shares on day t as

$$AVOL_{it} = (V_{it} - \bar{V}_i) / \mathbf{s}_i. \quad (4)$$

This formulation follows Landsman and Maydew (2002). Daily turnover, V_{it} , is a number of shares of firm i traded during day t divided by the number of shares outstanding. \bar{V}_i and \mathbf{s}_i are the mean and standard deviation of daily turnover of firm i estimated over days -150 through -31 relative to the event day. $AVOL01$ and $AVOL05$, the measures we use in our test,

are simple sums of daily abnormal volume, $AVOL_{it}$, over days 0 and 1, and 0 through 5 relative to the day of the announcement, respectively.

The relationship between the market reaction metrics and pension funds holding is captured in a set of pooled regressions which control for factors recognised in the literature to have impact on the information content of scheduled public disclosures. These factors include firm size, the number of analysts following the stock, and market-to-book ratio. Larger firms are likely to produce and disseminate more information in the interim period and, as a consequence, their earnings announcements convey less new information (Atiase, 1985). Similarly, the information content of an announcement is expected to be negatively related to the number of financial analysts who follow the stock (Shores, 1990). The market-to-book ratio reflects a firm's growth opportunities which are sensitive to news on current performance. Consequently, announcements and surprises by growth companies may convey more relevant information than disclosures by value companies (Hotchkiss and Strickland, 2003).

The changes in volatility in response to the earnings surprises are measured in following regressions:

$$AVAR_i = \mathbf{b}_0 + \mathbf{b}_1 * PFH_i + \mathbf{b}_2 * SIZE_i + \mathbf{b}_3 * ABSFE_i + \mathbf{b}_4 * MB_i + \mathbf{e}_i, \quad (5)$$

$$AVAR_i = \mathbf{b}_0 + \mathbf{b}_1 * PFH_i + \mathbf{b}_2 * ABSFE_i + \mathbf{b}_3 * NOEST_i + \mathbf{b}_4 * MB_i + \mathbf{e}_i. \quad (6)$$

$AVAR$ denotes abnormal return volatility around the announcement. Due to the high correlation between $SIZE$ and $NOEST$ (0.71), these independent variables are not included in the same regression. \mathbf{b}_1 measures the impact of pension funds holdings on the extent of the stock market reaction (measured by abnormal volatility and abnormal trading volume), after controlling for other factors. If the funds holdings reduce the information content of the announcements, the coefficient will be negative. Similar regressions are run with abnormal trading volume as a dependent variable.

4. Empirical Results

4.1 Descriptive statistics

Table 2 presents descriptive statistics and Pearson correlation coefficients between variables.² On average, sample companies are large compared to firms traded on the WSE. Their mean and median capitalisation are PLN 2,533.18 mil and PLN 697.91 mil, respectively (not reported in the table), both of which are higher than the comparable statistics for all WSE listed firms and all stocks held by pension funds (as summarised in Table 1). Note that the firms in our sample are large companies that are of interest to analysts, and thus appear on the I/B/E/S tape. Small companies are less likely to be followed by analysts, which is reflected in a high positive correlation coefficient (0.71) between the number of issued forecasts and firm size. The relationship is in line with earlier studies on the U.S. market (e.g. Bhushan, 1989).

[Table 2 around here]

Pension funds hold up to a quarter of the sample companies' shares outstanding, with the mean of about 4%. The mean and median forecast errors are negative during this study period. Analysts are likely to be systematically optimistic and actual earnings tend to fail the median forecast, which is consistent with the findings of Easterwood and Nutt (1999). The magnitude of the forecast error is significantly negatively related to the firm size. Larger companies are more transparent, provide more interim information (Atiase, 1985) and are followed by a larger number of analysts, all of which lead to forecast accuracy.

The mean abnormal return volatility, *AVAR01*, exceeds 2.0 and indicates increased market volatility around the announcement. Additionally, we find positive mean abnormal trading volume, *AVOL01*. These results show that earnings announcements, on average, convey new information. Both measures are negatively correlated with pension funds holding,

² For brevity, *AVAR05*, *AVOL05* and cumulative abnormal returns are not included in the table.

which suggests that pension funds holding reduces the impact of information contained in the announcements. This finding is consistent with the findings of El-Gazzar (1998). Moreover, we find that growth stocks react stronger to earnings news, as reflected by statistically significant positive correlation between abnormal volume, *AVOL01*, and market-to-book ratio, *MB*. The finding corroborates the notion that current earnings provide information about growth prospects of a firm and, consequently, growth companies are likely to be more sensitive to earnings information (Hotchkiss and Strickland, 2003).

4.2. Cumulative Abnormal Returns and Earnings Response Coefficients

Our first question was whether fund managers have any information advantage over the public around the time of earnings announcements. To test this hypothesis, we partition our pooled sample based on the value of pension funds holding (high ownership if *PFH* is greater than its sample median and low ownership if *PFH* is smaller than its sample median). The market responses to the announcements would reveal the information content of earnings surprises in the two sub-samples, and thus whether fund managers have any information advantage over the general trading public.

Our second question is the nature of information advantage that fund managers may have. Assuming that fund managers are competitive and competent, they would collect all available information and would process it thoroughly. They would buy/sell if the information points to a potential price change. The magnitude of their response to the news would, therefore, be proportional to the quality and value of data and not to sign of prospective price change. To look into this issue, we divide our sample into two sub-samples based on the sign of the forecast error. The market response for the high pension funds ownership stocks in the two sub-samples could reveal information about the nature of pension fund managers' information advantage. If the responses in two events are about the same, then we can conclude that the fund managers are superior in acquiring and/or processing information

(public or private) and use this superiority regardless of whether the upcoming news is good or bad. However, if there is an asymmetrical response to announcements in the positive and negative news sub-samples, then we can rule out the possibility that they have an unconditional informational superiority (resulting from public or private information, or better models).

Cumulative abnormal returns around earnings announcement dates are summarised in Table 3. We expect the immediate market reaction to the disclosure to be reflected in stock prices on the day of the announcements or on the following day when the information receives wide media attention. Over those two days, we find that there is a positive response of 1%, on average, when a company reports earnings above the consensus forecast. In the case of negative forecast errors, the reaction is -1.5% . Earnings disclosures move stock prices in the direction consistent with the sign of a forecast error, thus we conclude the overall, they have some new information.

[Table 3 around here]

The whole sample results indicate that there is a significant price run-up in the month before the scheduled announcements (-30 to -6 window) for both positive and negative forthcoming news. Could this be an indication of the general optimism that existed during the internet bubble? At the beginning of the year 2000, when 53 out of 124 announcements in our sample took place, the internet bubble drove stock prices up and the market participants seemed to be hardly affected by the forthcoming adverse news about companies' financial performance. A closer look at CARs over one week prior to the announcement (-5 to -1) shows an interesting distinction between positive and negative news sub-samples. While in the positive surprise sub-sample the buying frenzy continues, in the negative surprise sub-sample it fades. This indicates that there may be some information release prior to the

formal disclosure. Some traders somehow receive pre-disclosure information. In the post-announcement periods, there is a clear evidence of price reversal when the earnings announcement is negative. This may indicate a portfolio rebalancing following a pre-event price run-up.

Do pension fund managers have any advantage over the rest of traders? The low and high pension funds sub-samples may have some answers. The announcement day response for positive forecast errors is positive and significant for low ownership stocks, but not significant for our high ownership sample. Stocks that are largely held by pension funds do not seem to reveal any new information at announcement, indicating that the earnings information is already reflected in the stock prices. This is a clear indication that pension fund managers have better information, at least when the news is good. However, when the news is bad, both sub-samples show negative response.

One possible explanation for this asymmetry is that company managers use discretion not to reveal unfavourable information until the obligatory deadlines. Unless there is a disclosure constraint, managers seem to have a tendency to withhold the information that is deemed to be adverse. This supports our notion that companies provide pre-disclosure information discriminately, both with respect to the type of information and with respect to the recipients. They prefer to release the good news, and when they do, they are likely to share it with fund managers. In the post-event period, like the results in the whole sample, there is no correction when the earnings surprise is positive and significant price corrections up to five days later, when the earnings surprise is not.

To summarise, Table 3 provides some interesting observations about our high pension fund holdings sub-sample. In the pre-announcement period, when the forthcoming news is positive, prices move up significantly, but when it is negative, they do not significantly drop. The asymmetry could also be seen at the announcement. When the news is good, there is no surprise, but when the news is bleak, there is a surprise in the market. This may have some

information about the nature of information asymmetry between fund managers and other traders.

Further light is shed on the impact of pension fund holdings on the stock price behaviour around earnings announcements through the analysis of Earnings Response Coefficients (ERC). Whereas CARs indicate whether stock prices react to the event, ERCs describe the relation between the price reaction and the magnitude of the earnings surprise. The estimated coefficients of regression (2) are presented in Table 4.

[Table 4 around here]

We find significant response to the magnitude of the surprise in the low pension funds ownership sub-sample. Abnormal price behaviour is associated with the magnitude of the earnings innovations in both positive and negative forecast error sub-samples, with the ERCs in the window (0, 5) being significant at the 5% and 10% levels, respectively. The movements in prices of stocks largely held by pension funds seem not to be related to the size of the earnings surprise. A possible explanation is the smaller information content of scheduled disclosures for pension funds managers, which corroborates Table 3 results and supports the hypothesis that fund managers have an information advantage over other traders. The fund managers may have access to private information prior to the disclosure, which is indicated by the ERC for the week preceding earnings disclosures, i.e. window (-5, -1). The coefficient in the high ownership group (for the whole sample) is significant at the 10% level, whereas in the low ownership group it is not different from zero. However, the difference between both groups is not significant.

Taken together, Table 4 results show that earnings announcements convey less new information for the fund managers and stocks largely held by pension funds seem to incorporate the earnings surprises before the public release of the pertinent information.

4.3. Return volatility and trading volume around the announcement

In this section, abnormal return volatility over windows (0, 1) and (0, 5) relative to the disclosure date, *AVAR01* and *AVAR05*, and abnormal trading volume over these windows, *AVOL01* and *AVOL05*, are used to analyse the determinants of the information content of earnings announcements. These measures are regressed on a set of predictor variables (models 5 and 6), and the estimated coefficients are presented in Table 5 and Table 6.

[Table 5 and Table 6 around here]

The regression results support the findings of the pair-wise correlation analysis. Controlling for other factors, pension funds holding, *PFH*, remains an important determinant of the market reaction to earnings news. The reaction measured with both the abnormal return volatility and the abnormal trading volume decreases significantly with pension funds concentration, and the coefficients are significant at the 5% levels in every model specification. These results are in line with findings by El-Gazzar (1998) for the U.S. market and suggest that the pension funds play a stabilising force in the market place, which in turn may be caused by their prior exposure to the pertinent news. If pension funds managers are privy to undisclosed information before the public announcement of such information, the information gets reflected in the stock price, and thus at announcement would not have as much impact. Consequently, scheduled announcements convey less new data for the market when the share of stock held by the funds is larger.

The estimated coefficients for firm size and number of analysts following the stock are negative for both volume and volatility regressions. But the coefficients are generally insignificant, except for the firm size over the five days after the announcement. The information content of the announcements is lower for larger stocks and for stocks with

higher analyst coverage. These results support the notion that large companies disseminate more pre-disclosure information and therefore are more transparent (Atiase, 1985). Similarly, the greater number of analysts following a company results in a better company visibility in the interim period. Moreover, the reaction is stronger for growth companies, as reflected in the positive coefficients at the market-to-book ratio, *MB*.

5. Summary and Conclusions

We analyse the impact of institutional investors ownership concentration on the market reaction around corporate earnings announcements. Abnormal returns, abnormal return volatility and abnormal trading volume are used as proxies for the reaction. The data come from the Polish stock market, where pension funds established in 1999 within the general pension system reform form a homogenous and highly competitive investor class with an increasing share in the stock market capitalisation.

We find that pension funds have some information advantage over other investors, but the advantage is not unconditional. We can observe that prices of stocks largely held by pension funds do not reflect any new information at the announcement of good news which may indicate that investors are not surprised by the disclosure and the conveyed information is already incorporated into prices. However, the pension funds managers are as surprised as other traders when the earnings surprises are negative. This, we attribute to the notion that company managers may be providing pension funds with information in a selective fashion. When the news is good, they share the information quickly, but when the news is not flattering, they hold on to it until the obligatory deadline.

Moreover, we find that the magnitude of price changes for stocks with lower pension funds ownership tend to be related to the size of earnings surprise, while prices of stocks with higher funds holdings seem to be driven by a different set of information. Pension funds managers may have access to information in the interim period. Over a few days directly

preceding the disclosure, prices of stocks with large pension funds ownership incorporate a part of earnings innovation, which further supports the possibility of information release to fund managers.

Our data on abnormal return volatility and abnormal trading volumes support the findings that a larger share of pension funds in the company's shareholders base reduces the extent of new information conveyed by the announcement. Pension funds holding, as measured by the percentage of the shares outstanding held by funds, is a significant determinant of the market reaction to accounting disclosures, after controlling for firm size, number of analysts following the stock, magnitude of the earnings surprise and market-to-book ratio.

Our findings contribute to a better understanding of how the markets impound information in stock prices, where large institutional investors hold and trade large quantities of shares of stock.

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Table 1
Polish Stock Market and Pension Funds Holdings

| | Dec '99 | Jun '00 | Dec '00 | Jun '01 | Dec '01 | Jun '02 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| Stock market capitalisation (PLN mil) | 123,411.0 | 138,182.0 | 130,085.0 | 103,203.0 | 103,370.0 | 108,941.0 |
| 6-month turnover value (PLN mil) | 34,176.6 | 65,556.6 | 38,100.9 | 33,972.8 | 26,575.2 | 26,080.0 |
| Number of listed companies | 221 | 222 | 225 | 230 | 230 | 230 |
| Mean capitalisation of listed companies (PLN mil) | 558.4 | 622.4 | 578.2 | 448.7 | 449.4 | 473.7 |
| Median capitalisation of listed companies (PLN mil) | 67.3 | 69.1 | 62.9 | 49.2 | 42.8 | 37.0 |
| Mean market-to-book ratio | 1.4 | 1.6 | 1.5 | 1.0 | 1.2 | 1.7 |
| Median market-to-book ratio | 1.0 | 1.0 | 1.0 | 0.8 | 0.7 | 0.7 |
| Pension funds holdings in stocks (PLN mil) | 641.5 | 770.2 | 3,140.1 | 3,624.5 | 5,257.8 | 7,053.5 |
| Pension funds' share in stock market capitalisation | 0.5% | 0.6% | 2.4% | 3.5% | 5.1% | 6.5% |
| Number of pension funds | 21 | 21 | 21 | 20 | 17 | 17 |
| Number of stocks in pension funds' portfolios | 68 | | 96 | | 106 | |
| Mean capitalisation of companies held by pension funds (PLN mil) | 1,643.7 | | 1,224.0 | | 915.2 | |
| Median capitalisation of companies held by pension funds (PLN mil) | 301.7 | | 189.7 | | 119.1 | |
| Mean market-to-book ratio of companies held by pension funds | 2.0 | | 1.9 | | 1.4 | |
| Median market-to-book ratio of companies held by pension funds | 1.3 | | 1.2 | | 1.0 | |
| Mean holdings (% of shares outstanding) | 1.6% | | 4.7% | | 8.3% | |
| Median holdings (% of shares outstanding) | 0.9% | | 3.9% | | 6.3% | |

Data were obtained from the Warsaw Stock Exchange, the Insurance and Pension Funds Supervisory Commission, and from the pension funds.

Table 2
Descriptive Statistics and Pearson Correlation Coefficients of Primary Variables

| A. Descriptive Statistics | | | | | | | |
|-------------------------------------|---------|----------|-----------|-----------|----------|----------|-----------|
| Variable | Mean | Std Dev. | Min | Q1 | Median | Q3 | Max |
| SIZE | 6.7658 | 1.4090 | 3.7766 | 5.6977 | 6.5481 | 7.9036 | 10.7100 |
| PFH | 0.0398 | 0.0484 | 0.0000 | 0.0034 | 0.0266 | 0.0557 | 0.2546 |
| FE | -0.0600 | 0.2613 | -2.7122 | -0.0413 | -0.0054 | 0.0017 | 0.2016 |
| NOEST | 6.2016 | 4.4356 | 1.0000 | 2.0000 | 5.0000 | 10.0000 | 19.0000 |
| MB | 2.1660 | 2.3427 | 0.0000 | 1.0600 | 1.3850 | 2.3300 | 19.4000 |
| AVAR01 | 3.3977 | 6.1857 | 0.0070 | 0.3412 | 1.1204 | 3.0682 | 35.8030 |
| AVOL01 | 1.9630 | 5.9549 | -2.1900 | -0.6290 | 0.1503 | 2.8260 | 53.9806 |
| B. Pearson Correlation Coefficients | | | | | | | |
| | SIZE | PFH | ABSFE | NOEST | MB | AVAR01 | AVOL01 |
| SIZE | 1.0000 | -0.1204 | -0.2098** | 0.7088*** | 0.2228** | -0.0146 | -0.0477 |
| PFH | | 1.0000 | -0.0912 | -0.1259 | 0.0025 | -0.1669* | -0.1733* |
| ABSFE | | | 1.0000 | -0.1287 | -0.1422 | -0.0665 | -0.0427 |
| NOEST | | | | 1.0000 | 0.2296** | 0.0164 | -0.0353 |
| MB | | | | | 1.0000 | 0.1459 | 0.1760* |
| AVAR01 | | | | | | 1.0000 | 0.4788*** |
| AVOL01 | | | | | | | 1.0000 |

The sample includes 124 earnings announcements by Polish companies from the period 2000-2002. SIZE is the natural logarithm of company's market capitalisation (in PLN mil) measured two days prior to the earnings announcement. PFH is the percentage of shares outstanding held by pension funds. FE is the difference between actual earnings and median analysts' forecast, deflated by the stock price two days prior to the announcement. ABSFE is the absolute value of FE. NOEST is the number of earnings forecasts in the month prior to the announcement. MB is market to book ratio. AVAR01, abnormal return volatility, is calculated as the sum of squared standardised market model residuals on days 0 to 1 relative to the earnings announcement day. AVOL01, is abnormal trading volume measured as the sum of abnormal share turnover on days 0 to 1 relative to the earnings announcement day. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table 3
Cumulative Abnormal Returns around Earnings Announcements

| Event Period | Whole Sample | | High Ownership | | Low Ownership | | Difference in means t-statistics |
|---|--------------|----------------------|----------------|----------------------|---------------|---------------------|----------------------------------|
| | Mean | t-statistics | Mean | t-statistics | Mean | t-statistics | |
| A. Positive forecast errors (N=40) | | | | | | | |
| (-30, -6) | 0.0358 | 1.66 [*] | 0.0305 | 0.94 | 0.0401 | 1.40 | 0.25 |
| (-5, -1) | 0.0348 | 3.89 ^{***} | 0.0381 | 2.81 ^{***} | 0.0322 | 2.69 ^{***} | -0.22 |
| (0, 1) | 0.0100 | 1.79 [*] | -0.0036 | -0.42 | 0.0212 | 2.83 ^{***} | 1.95 [*] |
| (0, 5) | -0.0095 | -0.96 | -0.0169 | -1.13 | -0.0035 | -0.26 | 0.48 |
| (6, 30) | -0.0336 | -1.56 | -0.0407 | -1.25 | -0.0277 | -0.96 | 0.32 |
| B. Negative forecast errors (N=84) | | | | | | | |
| (-30, -6) | 0.0343 | 2.23 ^{**} | 0.0228 | 1.28 | 0.0468 | 1.83 [*] | 0.88 |
| (-5, -1) | 0.0052 | 0.81 | -0.0004 | -0.06 | 0.0114 | 1.07 | 0.95 |
| (0, 1) | -0.0149 | -3.74 ^{***} | -0.0153 | -3.30 ^{***} | -0.0145 | -2.19 ^{**} | 0.09 |
| (0, 5) | -0.0259 | -3.70 ^{***} | -0.0248 | -3.05 ^{***} | -0.0271 | -2.32 ^{**} | -0.14 |
| (6, 30) | -0.0037 | -0.24 | -0.0331 | -1.86 [*] | 0.0286 | 1.12 | 1.91 [*] |

The sample includes 124 earnings announcements by Polish companies from the period 2000-2002. Earnings which exceed I/B/E/S median forecasts are defined as positive forecast errors; they are defined as negative forecast errors otherwise. Abnormal returns are market model adjusted. Market model estimates are computed over days -150 to -31 relative to the announcement day. The sample is partitioned into high/low pension funds ownership sub-samples based on whether pension funds holdings in the firm, PFH, are higher or lower than the sample median. ^{***}, ^{**} and ^{*} indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table 4
Earnings Response Coefficients in High and Low Pension Funds Ownership Groups

| Event Period | High Ownership ERC | | Low Ownership ERC | | H ₀ : $\mathbf{b}_1 = \mathbf{b}_2$ F-statistic |
|------------------------------------|--------------------|------------|-------------------|------------|---|
| | \mathbf{b}_1 | std. error | \mathbf{b}_2 | std. error | |
| A. Positive forecast errors (N=40) | | | | | |
| (-30, -6) | 0.1100 | (0.5820) | 0.2230 | (0.5773) | 0.02 |
| (-5, -1) | 0.0614 | (0.3995) | 0.5091 | (0.3963) | 0.74 |
| (0, 1) | -0.0303 | (0.2075) | 0.1038 | (0.2058) | 0.25 |
| (0, 5) | 0.6093 | (0.3954) | 0.8456** | (0.3922) | 0.21 |
| (6, 30) | -1.5918*** | (0.5496) | -0.0025 | (0.5452) | 4.92** |
| B. Negative forecast errors (N=84) | | | | | |
| (-30, -6) | -0.3461** | (0.1690) | -0.1217*** | (0.0428) | 1.73 |
| (-5, -1) | 0.1118 | (0.0789) | 0.0007 | (0.0200) | 1.96 |
| (0, 1) | -0.0576 | (0.0539) | 0.0441*** | (0.0137) | 3.50* |
| (0, 5) | -0.1472 | (0.0936) | 0.0764*** | (0.0237) | 5.61** |
| (6, 30) | -0.0435 | (0.1741) | -0.2903*** | (0.0441) | 1.98 |
| C. Whole sample (N=124) | | | | | |
| (-30, -6) | -0.2580* | (0.1547) | -0.1116*** | (0.0424) | 0.85 |
| (-5, -1) | 0.1541* | (0.0864) | 0.0110 | (0.0237) | 2.61 |
| (0, 1) | -0.0060 | (0.0527) | 0.0516*** | (0.0144) | 1.13 |
| (0, 5) | -0.0619 | (0.0954) | 0.0859*** | (0.0261) | 2.29 |
| (6, 30) | -0.1736 | (0.1587) | -0.2901*** | (0.0435) | 0.51 |

The table presents Earnings Response Coefficients estimated in the following regression:

$$CAR(p, q)_i = \mathbf{b}_0 + \mathbf{b}_1 * HPFH_i * FE_i + \mathbf{b}_2 * LPFH_i * FE_i + \mathbf{e}_i,$$

where HPFH (LPFH) is a dummy variable that takes the value of one when pension funds holdings are above (below) the sample median, and zero otherwise. Estimated \mathbf{b}_1 and \mathbf{b}_2 are Earnings Response Coefficients in high and low pension funds ownership groups, respectively. FE is the difference between actual earnings and median analysts' forecast, deflated by the stock price two days prior to the announcement. Cumulative abnormal returns computed over different windows are market model adjusted. Market model estimates are computed over days -150 to -31 relative to the announcement day. The sample includes 124 earnings announcements by Polish companies from the period 2000-2002. Standard errors of the estimated coefficients are provided in the parentheses. ***, **, and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table 5
Regressions of Abnormal Return Volatility around Earnings Announcement
on Pension Funds Ownership and Control Variables

| Variable | AVAR01 | | AVAR05 | |
|---------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | (i) | (ii) | (iii) | (iv) |
| CONSTANT | 6.2192** (2.9264) | 4.0139*** (1.2010) | 20.3266*** (4.7549) | 11.3557*** (1.9794) |
| PFH | -23.6581** (11.5225) | -22.9512** (11.5456) | -42.7768** (18.7218) | -39.4228** (19.0295) |
| SIZE | -0.3868 (0.4115) | | -1.5262** (0.6686) | |
| ABSFE | -1.9242 (2.2150) | -1.6417 (2.1906) | -6.0827* (3.5989) | -4.8818 (3.6105) |
| NOEST | | -0.0682 (0.1296) | | -0.2239 (0.2136) |
| MB | 0.4082* (0.2420) | 0.3904 (0.2434) | 0.4198 (0.3932) | 0.3313 (0.4012) |
| adj. R ² | 0.0285 | 0.0235 | 0.0535 | 0.0211 |

The table presents estimated coefficients and their standard errors of the following regressions:

$$AVAR_i = b_0 + b_1 * PFH_i + b_2 * SIZE_i + b_3 * ABSFE_i + b_4 * MB_i + e_i \text{ (models i and iii),}$$

$$AVAR_i = b_0 + b_1 * PFH_i + b_2 * ABSFE_i + b_3 * NOEST_i + b_4 * MB_i + e_i \text{ (models ii and iv).}$$

The dependent variable is abnormal return volatility. It is calculated as the sum of squared standardised market model residuals on days 0 to 1 (models i and ii) and 0 to 5 (models iii and iv) relative to the earnings announcement day. The market model estimation window runs from days -150 to -31 relative to the announcement day. SIZE is the natural logarithm of the company's market capitalisation measured two days prior to the earnings announcement. PFH is the percentage of shares outstanding held by pension funds. ABSFE is the absolute value of the difference between actual earnings and median analysts' forecast, deflated by the stock price two days prior to the announcement. NOEST is the number of earnings forecasts in the month prior to the announcement. MB is market to book ratio. The sample includes 124 earnings announcements by Polish companies from the period 2000-2002. ***, ** and * indicate significance at the 0.01, 0.05 and 0.10 levels, respectively.

Table 6
Regressions of Abnormal Trading Volume around Earnings Announcement
on Pension Funds Ownership and Control Variables

| Variable | AVOL01 | | AVOL05 | |
|---------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | (i) | (ii) | (iii) | (iv) |
| CONSTANT | 5.5764** (2.7920) | 2.8283** (1.1450) | 7.2748 (4.5677) | 4.4075** (1.8674) |
| PFH | -23.9171** (10.9932) | -23.5998** (11.0075) | -45.4081** (17.9849) | -45.7133** (17.9522) |
| SIZE | -0.5377 (0.3926) | | -0.6238 (0.6423) | |
| ABSFE | -1.3722 (2.1132) | -1.0811 (2.0885) | -2.0148 (3.4573) | -1.7800 (3.4061) |
| NOEST | | -0.1480 (0.1235) | | -0.2255 (0.2015) |
| MB | 0.4991** (0.2309) | 0.4959** (0.2321) | 1.3993*** (0.3777) | 1.4175*** (0.3785) |
| adj. R ² | 0.0458 | 0.0423 | 0.1168 | 0.1191 |

The table presents estimated coefficients and their standard errors of the following regressions:

$$AVOL_i = b_0 + b_1 * PFH_i + b_2 * SIZE_i + b_3 * ABSFE_i + b_4 * MB_i + e_i \text{ (models i and iii),}$$

$$AVOL_i = b_0 + b_1 * PFH_i + b_2 * ABSFE_i + b_3 * NOEST_i + b_4 * MB_i + e_i \text{ (models ii and iv).}$$

The dependent variable is abnormal trading volume measured as the sum of abnormal share turnover on days 0 to 1 (models i and ii) and 0 to 5 (models iii and iv) relative to the earnings announcement day. Abnormal share turnover on a given day is calculated as the company's share turnover (trading volume divided by the number of shares outstanding) that day less its mean in the estimation window with the difference scaled by standard deviation of daily turnover in the estimation window. The estimation window runs from days -150 to -31 relative to the announcement day. SIZE is the natural logarithm of the company's market capitalisation measured two days prior to the earnings announcement. PFH is the percentage of shares outstanding held by pension funds. ABSFE is the absolute value of the difference between actual earnings and median analysts' forecast, deflated by the stock price two days prior to the announcement. NOEST is the number of earnings forecasts in the month prior to the announcement. MB is market to book ratio. The sample includes 124 earnings announcements by Polish companies from the period 2000-2002. *** and ** indicate significance at the 0.01 and 0.05 levels, respectively.

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