AGH Managerial Economics
2012, nr 12, s. 41–60
doi: 10.7494/manage/2012.12.41

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Responses of the Warsaw Stock Exchange to the U.S. Macroeconomic Data Announcements

1. Introduction

Many empirical contributions reflect a significant stock price and volume reaction to different public and firm specific announcements which are called events. These announcements may contain information with respect to just decided or planned new activities of a company. These activities may be started by a company itself, rival company, other market participants or government. The released important information affecting prices and trading volume may concern the firm itself, the respective sector or the whole economy. Another classification of information refers to historical prices of securities, public information about issuer or confidential company information. Empirical results support the view that individual asset prices and trading volume are influenced by unanticipated events (releases of information). However, some events have a more persistent effect on security prices and trading volume than do others.

The idea that stock markets are sensitive to macroeconomic news is well known in the economic and financial literature. The majority of economists believe that market participants follow government releases of economic data and news in monetary policy and hence macroeconomic news can have a serious impact on the stock exchange. Moreover, although the press suggests that there is a strong link between macroeconomic data announcements and movements in stock prices, there exist few empirical attempts to identify which macroeconomic variables announcements determine asset pricing on the equity market what could reflect that rather common belief.

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One of the first papers concerning the relationship between macroeconomic indicators and stock prices was an article by Chen et al. [7] who investigated e.g. the influence of expected and unexpected inflation or industrial production on stock prices. Since then a variety of macroeconomic variables have been studied. However, the literature concerning the impact of macroeconomic announcements is rather limited and in some cases empirical results are ambiguous.

The importance of the American economy suggests that investors in their forecasts and expectations should take into account U.S. macroeconomic indicators, thus the U.S. announcement released should play an important role in determining stock prices. In our study we examine the impact of announcements on inflation, industrial production and unemployment on most liquid stock listed on the SE. In order to examine the strength, direction and duration of the impact of these announcements releases we use the event study approach.

The information content of different announcements has been a topic of scientific discussion and public debate since Miller and Modigliani [34, 35]. Event studies became a key empirical tool in studies devoted to these issues. There is widely accepted fact that event studies have been introduced to capital market research in papers by Ball and Brown [2] and Fama *et al.* [17]. Despite many modifications in the event study methodology over the years, the main elements of a typical event study refer to these early papers. However, the mentioned papers were not the first event studies. According to MacKinlay [28] the earliest event study is that by Dolley [14]. He examined stock price reaction to stock splits. In the following years some other authors (like Myers and Bakay [37], Barker [3, 4, 5], Ashley [1]) published their event study contributions. In spite of these facts modern event study literature refers to Ball and Brown and Fama-Fisher-Jensen-Roll contributions because of two reasons. In these papers for the first time the market model by Sharpe [42] was applied and both papers used data from the newly established Center for Research in Security Prices (CRSP) at the University of Chicago. This data source became the standard in capital markets research. Moreover, by the end of the 1960s economists have got access to computer systems equipped with advanced statistical software. The examples of event study contributions concerned mainly with methodological issues are those by Corrado [10] and Corrado and Zivney [12].

The common interpretation of event study results in the literature is that the ability of announcements to move stock prices and change trading volume can serve as evidence of their significant information content. From a theoretical point of view, it is however often no obvious *a priori* whether or not an announcement can change stock prices or trading volume and if yes in which direction it influences these stock characteristics.

Up to now numerous event study contributions have been published in major economic journals. According to Kothari and Warner [24] five major finance journals have published over the period 1974–2000 more than 560 articles containing event study results. The last number is clearly conservative since it does not include event study contributions in accounting journals and other finance journals, especially outside of the U.S. The most important and recent reviews of event study papers include contributions by MacKinlay [28], McWilliams and Siegel [33], McWilliams and McWilliams [32], Lamdin [25], Serra [41], Cichello and Lamdin [8], Johnston [23] and Corrado [11].

The structure of this paper is as follows: section 2 presents the overview of literature concerning event study and impact of macroeconomic announcements on security prices. Section 3 presents conjectures and their scientific justification. Section 4 presents the data, whereas empirical results and the discussion of them is presented in section 5. The last section concludes the paper.

2. Literature review

The role of information is one of the main topics in modern economic literature concerning financial markets. The contributors try to evaluate the impact of different kinds of information on the value of companies acting on the stock exchange. The released information about macroeconomic variables may affect security returns as well as trading volume. Market participants observe releases of macroeconomic data and analyst often suggest a strong link between macroeconomic data announcements and changes in stock prices. Following [31] researchers take into account the state of the economy when estimating the effect of macroeconomic announcements on stock returns. The macroeconomic variables used in most of the contributions are the Consumer Price Index (CPI), Index of Industrial Production *(IIP)* and the Unemployment Rate (UR).

Chen et al. [7] stress that modern financial theory has concentrated on systematic effects as the likely source of investment risk. However, in the event study literature the authors pay attention to the firm specific events but mostly ignore events that are likely to influence all assets, like macroeconomic announcements.

The reason may be that many economists think that financial markets influence the macroeconomics but not vice versa what would mean that opposite relationships exists. On the other hand, in finance it is usually assumed that stock prices adjust to external forces. However, due to [7] all economic variables are endogenous. The only exogenous factors on the world economy are natural forces.

The contributors stress in their paper that stock returns react to systematic economic news and stocks are priced in accordance with the content of these news. Therefore, it seems to be justified identification of macroeconomic variables that influence equity returns. The reason is twofold: first of all one may find hedging opportunities for investors. Second, if market participants (potential investors) are averse to fluctuations in macroeconomic variables, then these variables may be counted to priced factors.

Cutler et al. [13] have proven whether unexpected macroeconomic announcements have explanatory power i.e. whether they can explain a significant part of security price movements. The contributors analyzing relations of stock returns to news about macroeconomic performance, could explain no more than one third of return variance by means of this kind of news. The news announcements effects on returns are mostly identified in the empirical literature. But the impact of the news on the absolute level of securities prices is rather unclear. According to common among economists opinion the fluctuations in asset prices are caused by changes in the fundamental value of companies. The stock prices react to announcements the respect to corporate policy, governmental regulatory policy, and macroeconomic conditions affecting fundamentals. It means that the same information can cause different results according to the economic situation of the country. The strength and direction of the impact of economic announcements on the market depends on the state of the economy.

One of the most important macroeconomic variables is the inflation rate. The relation between inflation and stock returns is reflected in numerous hypotheses concerning the effects of unanticipated inflation on stock returns. The economists observed that the relationship between unexpected inflation and stock returns confirms the conjecture that in unexpected inflation is incorporated new information about future levels of expected rate of inflation. This effect is found e.g. by Fama and Schwert [18]. Schwert [40] tried to find evidence on the interdependence between the daily returns of the Standard and Poor's composite portfolio around the CPI announcement. He found that the stock market reacts to unexpected inflation in the event window i.e. primarily on the day of the CPI announcements, but this reaction is rather weak. According to Li and Hu [26] announcements about the inflation rate could also affect the financial market not only by means of inflationary expectations. They argued that unanticipated high inflation may be a reason for the expectation of a more restrictive monetary policy. This kind of policy can lead to the reduction of cash flows and lower stock prices. In addition, a high unexpected inflation rate could force agents to increase their savings. The consequences of such agents' reaction would be higher interest rates and lower stock prices. According to [26] these possible interrelations suggest that the unexpected new information contained in CPI and

PPI announcements are likely to be positively related to interest rates, therefore negatively related to stock prices. A similar point of view based on the "Taylor rule" (interest rates are a linear function of inflation and gross national product) is presented in [9]. Authors justify their conviction that bad news about inflation can be good news for the exchange rate if the central bank follows the mentioned rule. This occurs because the bad news about inflation forces government to start a policy that causes anticipated currency appreciation. This can influence stock price formation. On the other hand, rising inflation forces investors to look for savings and hence to sell bonds, especially long-term with fixed interest rates. It can cause a fall in bond prices and encourage investment in another financial instrument i.e. stocks, that give opportunity for higher profits. Consequently, it could increase stocks prices.

Boyd et al. [6] explained the impact of unemployment news on security prices. Unemployment news joint two types of information relevant for valuing stocks: information about future interest rates and future corporate earnings and dividends. An increase in unemployment typically signals a decline in interest rates. This is good news for stocks. However unemployment causes also decline in future corporate earnings and dividends, which is bad news for investors. The feature of this bundle i.e. the relative importance of the two effects changes over time and is related to the state of the economy. Hence, the unambiguous relationship between unemployment rate and the level of stock prices cannot be simply determined. The link needs to be verified empirically.

It is widely accepted in the literature that industrial production is a proxy for the level of real economic activity. An increase in industrial production reflects economic growth. Fama [15] found that the growth rate of industrial production has a strong contemporaneous link with stock returns. Geske and Roll [20], Fama [16] and Tainer [43] assumed a similar positive relationship taking into account the impact of industrial production on future cash flows. Chen et al. [7] indicated that future growth in industrial production was a significant factor which affected stock returns. They argued that the productive capacity of an economy is determined by the accumulation of real assets. Technical equipment enhances the ability of companies to generate cash flow.

According [31] the endogeneity of macroeconomic policy explains the low explanatory power of economic variables for security returns. However, there have been a growing number of contributions demonstrating a strong influence of macroeconomic variables on stock markets, mostly for industrialized countries (compare, for example, [21], [36], [19], [27], [38]. Contributors have started to turn their attention to examining similar relationships in developing countries, in particular in the rapidly growing economies of Asia (compare [29], [30].

3. Hypotheses

On the basis of the literature we hypothesize some relationships between industrial production, consumer price index and unemployment rate with the security returns of the Warsaw Stock Exchange.

Inflation

The results of studies by Nelson [39] and Jaffe and Mandelker [22], Fama and Schwert [18], Chen et al. [7] are in favor of a negative relationship between inflation and stock prices. We conjecture analogously that an increase in the rate of inflation is likely to imply fiscal tightening policies. This increases the nominal risk-free rate and the discount rate. However, as we pointed out in section 2, it is not clear for us that concern about more restrictive monetary policy leads to lower stock prices. Therefore , we verify it empirically.

Industrial production

The procyclical nature of industrial production and the theoretical reasoning reviewed in the last section imply that a positive relationship between industrial production and stock prices can be expected also for the Polish economy.

Unemployment

Taking into account [6] we assume that on average an announcement of rising unemployment is 'good news' for stocks during economic expansions and 'bad news' during economic contractions. Thus, stock prices usually increase on news of rising unemployment, since the economy is usually in an expansion phase.

4. Data

In this study the impact on stock prices and trading volume of announcements of three U.S. macroeconomic indicators are examined: Consumer Price Index (CPI), Unemployment Rate and Index of Industrial Production (IIP). The announcements of these indicators are released on a monthly basis. Hence, in the whole period under study i.e. between February 2004 and December 2011, there have been 95 releases of each announcement. CPI and IIP are released usually about the 16th of each month whereas the Unemployment Rate is usually announced at the beginning of the month. For each release, the real value of the announced indicator is compared with its consensus forecasts, thus the events are divided into three

clusters: 'above consensus', 'below consensus' and 'in line with consensus'. Our analysis will focused mainly on two first clusters because they include unexpected news. The type of an announcement and the number of events in each cluster in the period under study are presented in Table 1.

Table 1

Type of events

	Below consensus	**In line with consensus**	**Above consensus**
Consumer Price Index	31	28	36
Index of Industrial Production	47	8	40
Unemployment Rate	39	29	27

The reaction of investors on the WSE to U.S. macroeconomic data announcements is examined on the basis of quotations of the largest companies listed in WIG20 between January 2004 and December 2011. Our sample consists of 45 companies although not all of them have been listed in WIG20 for the whole period. Daily percentage log-returns are computed on the basis of the closing prices. Logarithms of daily trading volume are applied as a measure of investor trading activity.

The importance of macroeconomic announcements is examined by means of event study analysis. For each release, pre-event and event windows are defined. The data in the pre-event window are used to estimate the relevant model, while the fitted data in the event-window are used to test the statistical inference. Announcements are released monthly, thus the distance between two consecutive events is about 20 trading days. It determines the length of the pre-event and event windows. The event window is as short as possible and comprises three days: the announcement day ($t = 0$) plus one day before ($t = -1$) and one day after the event day ($t = +1$). Similarly, to minimize the possibility that the data will be influenced by the previous announcements the pre-event window of length 15 trading days was chosen. For each event the reaction of returns and trading volume of stocks listed at that moment in WIG20 is examined*. On the basis of stock returns in the pre-event window their average is estimated and abnormal returns (*AR*) are defined as the difference between actual return and the average from the pre-event window. The market model which is widely used in the event study analysis is inappropriate in this study because we do not analyze the reaction of single stock but by analysis of individual securities' reaction we examine

* We include in the sample only stocks that have been listed in WIG20 form 20 days before event to 5 days after it.

the reaction of the whole market on the appearing information. On the other hand, no time series model could be properly estimated due to the small number of data in the pre-event window.

5. Empirical results and their analysis

In this section we present the results of our conducted event study analysis. First, the announcements of each macroeconomic indicator will be studied separately. Later, interrelationships between them will be examined.

Unemployment

The results of estimating the reaction of trading volume and stock returns of stocks from WIG20 to Unemployment Rate announcement are presented in Table 2. Average abnormal trading volume ($\overline{AV}$) and average abnormal returns ($\overline{AR}$) in the event window are reported jointly with corresponding *t*-statistics. Because the most meaningful is investor reaction on unexpected news we do not report the results of the analysis when the announced rate of unemployment was in line with previous expectations which all are however not significant.

Table 2

Reaction of trading volume and stock returns to unemployment rate announcement

	Below consensus (39 events)		**Above consensus (27 events)**		**The whole sample (95 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.076	0.86	0.039	0.39	0.068	0.73
0	0.004	0.05	0.045	0.45	0.019	0.20
1	–0.095	–1.07	–0.214	–2.17**	–0.114	–1.22
	Stock returns					
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	0.207	0.79	0.430	1.23	0.182	0.90
0	0.227	0.87	0.115	0.33	0.010	0.05
1	0.416	1.59	0.299	0.85	0.163	0.80

*, **, *** – significant at 1%, 5% and 10% level respectvely

The mean abnormal trading volume in the announcement day is insignificantly different from zero in the whole sample as well as in each cluster. This means that announcements about the unemployment rate in the U.S. do not influence investor trading activity regardless of the meaning of the announcement. However, the day after the announcement a decrease in the trading volume can be observed. This drop is significant when the announced value of the unemployment rate is greater than expected, i.e. when 'bad news' for the U.S. economy is announced.

Announcements of unemployment rate have no significant effect on stock prices. Average abnormal returns, although positive, are insignificantly different from zero on any day in the event window regardless of the information content of the announcements. However, it should be noted that in the case of unemployment rate below consensus, where the average abnormal return is 0.4%, *t*-statistic is close to the critical value for 10% significance level.

The abovementioned results indicate that the U.S. unemployment rate announcements either do not convey any important information to investors on the WSE or their information content is ambiguous and causes divergent interpretations and reactions. The latter interpretation is in line with a theory presented by Boyd et al. [6] that an announcement about rising unemployment contains simultaneously some positive and negative information. The lack of significant reaction in the event day and generally insignificant price and trading volume changes the day after can also suggest uncertainty of investors on the WSE who wait for more information or reaction of investors in the U.S. and Asia.

Industrial Production

Results of analysis of impact of U.S. industrial production level announcements on the WSE are reported in Table 3. U.S. industrial production announcements are accompanied by a significant increase in trading activity on the WSE, especially when production is smaller than market expectations. In this case an increase in trading volume occurs on the announcement day and persists during the next trading day after the announcement. Both average abnormal volumes are significant at the 1% level. The rise in trading activity on the day of the announcement is also visible when the whole sample of 95 events is taken into account. It is mainly due to an increase in volume when production is below consensus (47 of 95 events). In the case of an announcement above forecasts trading volume also increases but not significantly. However, from these results it can be concluded that the information about the level of industrial production in the U.S. is important news for investors on the WSE.

Announcements have significant effects on trading volume especially when actual production is lower than market expectations. The accompanied negative

mean abnormal returns in the event window convinces the reader that the announcements are evaluated as bad news by market participants.

All calculated average abnormal returns in the event window are negative and only in a few cases these changes are significant. Significant price declines associated with the announcements of industrial production in the U.S. are independent of changes in investor activity – they appear when change in trading volume is insignificant. In the cluster of announced production below market expectations (47 events) we find a statistically significant average abnormal daily return of about –0.51 % on the day before the announcement. Similar result can be noticed in the sample of all industrial production announcements. This suggests that in the period under study the announcement about the level of industrial production in the U.S. was mainly associated with a negative reaction of investors on the WSE. It is possible that in this case, especially during the financial crisis, news about production in the U.S., regardless of consistency with forecasts, carried information about the slowdown in the U.S. economy. It is worth noting that 49 out of 95 events under study are connected with a drop in production when compared with the previous month, and 41 are associated with increased production.

Table 3

Reaction of trading volume and stock returns to industrial production announcements

	Below consensus (47 events)		**Above consensus (40 events)**		**The whole sample (95 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.056	1.13	0.051	0.67	0.031	0.58
0	0.157*	3.18	0.062	0.81	0.103***	1.92
1	0.140*	2.84	0.006	0.08	0.068	1.27
	Stock returns					
	$\overline{AR}$ **(%)**	*t*-statistic	$\overline{AR}$ **(%)**	*t*-statistic	$\overline{AR}$ **(%)**	*t*-statistic
–1	–0.509**	–2.09	–0.041	–0.15	–0.305***	–1.69
0	–0.156	–0.64	–0.032	–0.11	–0.207	–1.15
1	–0.175	–0.72	–0.024	–0.09	–0.110	–0.61

*, **, *** – significant at 1%, 5% and 10% level respectively

The significant drop in prices one day before the announcement can be caused by two factors. First, investors update their prior forecasts based on incoming information and opinions. Second, the drop is caused by CPI announce-

ments which are released a few days before or after IP announcements. In order to verify this second hypothesis the entire test is repeated, however, limiting it only to those events which were not preceded by an earlier CPI announcement. There is 43 such events in the period under study (22 below forecasts, 5 in line with forecasts and 16 above forecasts).

When the analysis is reduced to industrial production announcements which are released before the CPI announcements one can observe insignificant changes in trading volume on the event day in the whole sample as well as in the cluster of industrial production below consensus. However, in this cluster, a significant decrease of stock prices the day before the event is still observed. On the other hand, a decline in prices the day before the event reported in table 3 in the sample of all 45 events under study lost its significance but instead the significant average abnormal return in the day $t = 0$ is present*. Results in Table 4 means that industrial production announcements considered separately attract less attention to investors than when they are considered together with CPI announcements. However, significant values of mean abnormal returns indicate a strong influence on stock prices. This analysis also indicates that a significant decline in abnormal returns the day before the announcement below forecast is not caused by earlier news about CPI but results rather from updating investor expectations and forecasts.

Table 4

Reaction of trading volume and stock returns to industrial production announcement (earlier CPI announcements are excluded)

	Below consensus (22 events)		**Above consensus (16 events)**		**The whole sample (45 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	–0.007	–0.08	0.066	0.46	–0.006	–0.07
0	0.095	1.13	–0.041	–0.28	0.005	0.06
1	0.225*	2.67	0.029	0.20	0.116	1.45
	Stock returns					
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	–0.480***	–1.65	0.162	0.44	–0.226	–1.16
0	–0.399	–1.38	–0.245	–0.66	–0.420**	–2.15
1	–0.184	–0.63	–0.039	–0.10	–0.114	–0.58

*, **, *** – significant at 1%, 5% and 10% level respectively

* Its significance is mainly due to results (not mentioned) for announcements in line with forecasts when mean abnormal return is equal to –1.065%.

The Consumer Price Index

As it can be seen from table 5, mean abnormal trading volume is significantly greater than zero almost on every day in the event window. It is insignificant only at the day after the announcement above forecasts. A significant increase of investors' activity is observed on the announcement day as well one day before regardless of the correspondence of the announcement with market expectations. Additional tests conducted for event windows comprising five days (two days before and two days after the event) confirm a significant increase in trading volume in days $t = -0$ and $t = 0$ and show that two days before the CPI announcement increase in trading volume is insignificant. These results mean that investors start to react on the CPI announcement one day before the news is released but their reaction is the most intense on the day of the announcement because then the greatest value of abnormal trading volume is observed. Direction of reaction is indicated by movement of returns.

Table 5

Reaction of trading volume and stock returns to Consumer Price Index announcement

	Below consensus (29 events)		**Above consensus (34 events)**		**The whole sample (95 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.115**	1.96	0.096**	2.07	0.073**	2.00
0	0.221*	3.77	0.195*	4.22	0.175*	4.76
1	0.186*	3.17	0.037	0.81	0.103*	2.80
	Stock returns					
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	–0.869**	–2.09	–0.220	–0.15	–0.331***	–1.69
0	–0.453	–0.64	–0.109	–0.11	–0.223	–1.15
1	–0.766	–0.72	0.050	–0.09	–0.222	–0.61

*, **, *** – significant at 1%, 5% and 10% level respectively

From Table 5 it follows that significant change in trading volume is accompanied by decrease in stock returns. This drop is significant only on the day before the announcements below consensus and in the whole sample regardless of the value of the announced CPI. This change in prices is probably caused by updating investor earlier expectations about the value of inflation in the U.S. This updating is made on the basis of other macroeconomic indicators. However, it is impossible to verify if the observed change in prices is due to an earlier industrial

production announcement or is caused by other factors because there are only 15 CPI announcements which are not preceded by IP announcements (5 below consensus and 6 above consensus). As we mentioned in section 2, according to Li and Hu (1998) and Clarida and Waldman (2007) information in CPI announcements are likely to be negatively related to stock prices. However we also presented opinion that this relationship could be positive. Insignificant changes in stock prices observed in a majority of cases together with growth of trading volume suggest ambiguous interpretation of announcements and heterogeneous investor reaction to released value of CPI.

This is in agreement with previously mentioned two possible and opposite views.

Industrial Production and CPI announcements

In the whole period from February 2004 to December 2011 there were 35 cases when Industrial Production and CPI were announced the same day. Thus, based on this sample we can analyze the impact of these macroeconomic announcements on each other. To check which indicator conveys more important information to investors we performed two tests. One, when the sample is divided according to the value of industrial production announcements and the second when the same sample is divided according to the value of CPI announcements. Results of both tests are reported in Tables 6 and 7, respectively.

Table 6

Reaction of trading volume and stock returns to Industrial Production announcement when IP and CPI are announced on the same day

	Below consensus (14 events)		**Above consensus (18 events)**		**The whole sample (35 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.064	0.75	0.137	1.55	0.080	1.26
0	0.189**	2.22	0.188**	2.13	0.207*	3.23
1	0.092	1.07	0.049	0.56	0.065	1.01
	Stock returns					
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	–0.991**	–2.49	–0.228	–0.52	–0.561***	–1.67
0	0.251	0.63	0.296	0.68	0.087	0.26
1	–0.794***	–1.99	0.216	0.50	–0.237	–0.71

*, **, *** – significant at 1%, 5% and 10% level respectively

Table 7

Reaction of trading volume and stock returns to CPI announcement when IP and CPI are announced the same day

	Below consensus (14 events)		**Above consensus (18 events)**		**The whole sample (35 events)**	
	Trading volume					
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.143***	1.77	0.095	1.20	0.080	1.26
0	0.293*	3.65	0.286*	3.61	0.207*	3.23
1	0.172**	2.14	0.052	0.66	0.065	1.01
	Stock returns					
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	–1.179***	–1.76	–0.541	–1.50	–0.561***	–1.67
0	–0.275	–0.41	0.346	0.96	0.087	0.26
1	–0.676	–1.01	0.062	0.17	–0.237	–0.71

*, **, *** – significant at 1%, 5% and 10% level respectively

In both cases there is significant growth of investor activity in the event day. Moreover, trading volume increases significantly in the whole event window when CPI is announced below forecasts. From table 6 it follows that when IP and CPI announcements are released together only information that IP is below consensus impacts stock prices. Significant drop in stock prices on the day before the event reported in tables 3 and 4 remains still significant when CPI announcement is released together with information about the Industrial Production. Moreover, in this situation prices decrease about 0.79% even on the day after both announcements. These results indicate that in general the reaction of investors on the WSE to IP announcements does not alter when information about CPI appears earlier. Similarly, when the information content of CPI announcement is taken into account, a comparison of results in tables 5 and 7 indicates that stock prices reaction remain unchanged regardless of information about Industrial Production. CPI announcement mainly negatively affects stock prices with a significant drop the day before CPI announcement below expectations.

Table 8

Reaction of trading volume and stock returns to IIP announcement when IP and CPI are announced the same day but their comparison with forecasts is different

	Below consensus (9 events)		**Above consensus (10 events)**	
	Trading volume			
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.091	1.36	0.200**	2.11
0	0.211*	3.14	0.119	1.25
1	0.060	0.90	–0.029	–0.31
	Stock returns			
	$\overline{AR}$ **(%)**	*t*-statistic	$\overline{AR}$ **(%)**	*t*-statistic
–1	–0.480	–0.85	–0.136	–0.22
0	0.339	0.60	0.249	0.40
1	–0.359	–0.64	–0.112	–0.18

*, **, *** – significant at 1%, 5% and 10% level respectively

Above results indicate that investor reaction to CPI announcements is not affected by information about IIP and vice versa information about CPI does not influence the reaction to IIP announcements. However, the above tests do not indicate which macroeconomic indicator is more important and which of them has greater impact on stock prices. To determine this the above tests are repeated only for events when accordance of both indices with the expectations was different i.e. for example when CPI was below forecasts and IIP was above or in line with forecasts. In the whole period under study there are 21 such events. In such cases we divide events according to the agreement of CPI announcements with consensus or according to agreement of IIP announcements with consensus. Results of performed test in each cluster are presented in Tables 8 and 9 ,respectively. It shows that when values of macroeconomic indicators are divergent with prior forecasts they do not affect security prices – all average abnormal returns in the event window are insignificant. However, their impact on trading activity remains significant. It also means that CPI and IP announcements are essential for stock prices only when they deviate from consensus in the same direction.

Table 9

Reaction of trading volume and stock returns to CPI announcement when IP and CPI are announced the same day but their comparison with forecasts is different.

	Below consensus (6 events)		**Above consensus (7 events)**	
	Trading volume			
	$\overline{AV}$	*t*-statistic	$\overline{AV}$	*t*-statistic
–1	0.251*	3.27	0.136	1.48
0	0.416*	5.41	0.302*	3.29
1	0.194**	2.52	–0.053	–0.58
	Stock returns			
	$\overline{AR}$ (%)	*t*-statistic	$\overline{AR}$ (%)	*t*-statistic
–1	–0.551	–0.86	–0.770	–1.19
0	–0.592	–0.93	0.337	0.52
1	0.097	0.15	–0.575	–0.89

*, **, *** – significant at 1%, 5% and 10% level respectively

6. Conclusions

It is widely accepted that stock prices are sensitive to different external information. Our study of the impact of U.S. macroeconomic variables announcements on WSE securities shows that information about Consumer Price Index and Index of Industrial Production significantly affects investor reaction. In the period under study, i.e. from February 2004 to December 2011 CPI and IIP announcements implied a significant rise in trading volume around the day of announcement. However, their interpretation by investors was divergent, hence stock returns remain insignificantly different from zero on the event day. Prices move significantly mainly the day before the announcement, and this is probably due to updating investor expectations or their uncertainty connected with market reaction on announcements. Performed tests indicate that investor reaction on CPI announcements is mainly unaffected by IIP announcements and vice versa. However, when announced values of these macroeconomic indicators deviate from previous forecasts in different directions their impact diminishes. The conducted analysis indicates also that U.S. Unemployment Rate announcements had no essential impact on the WSE in the period under study what is in line with

results in the literature about an unambiguous relationship between unemployment rate and stock prices.

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