

# The Role of Revisions and Uncertainty in Professional Forecasts

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## Abstract

This paper aims at evaluating individual expectation accuracy of professional forecasters for 57 U.S., European, and German macroeconomic indicators over the period 1999-2010. The empirical analysis shows that initial announcements are partly considerably revised, and that some revisions occur systematically. Taking into account whether announcement are revised systematically and whether economists (assumably) aim at forecasting the initial release or the latest revision, significant differences can be observed with regard to forecasters' expectation errors. In general, forecasters that are (assumably) aiming to predict the latest revisions of German indicators are able to form better forecasts if these indicators are revised systematically. Though to a lower extent, this relationship is also observable regarding U.S. indicators. Forecasters' disagreement about fundamentals is higher during recessions and when stock markets are volatile.

**JEL classification:** D81, D84, E17

**Keywords:** Rational expectations; Macroeconomic indicators; Uncertainty; Survey analysis; Real-time data;

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## 1. Introduction

Market participants carefully watch scheduled announcements both of the main indicators for economic activity (fundamentals) and monetary policy (**Aruoba and Diebold, 2010 [8]; Urich and Wachtel, 1984b [71]**), because they potentially contain new information that is not incorporated into expectations of market participants (“news”) of past and future monetary policy and financial market conditions, which have an impact on financial markets and through a number of channels, also on the real economy (**Basistha and Kurov, 2008 [11]; Fama, 1991 [43]; 1970 [42]**). Therefore, many parts of modern macroeconomics use expectations of households, firms, and decision makers for evaluating the state of the economy. Households form expectations, e.g., about the inflation rate, the employment situation, and future income. Firms need forecasts to calculate their future costs and product demand, while monetary and fiscal policy makers incorporate expectations about inflation and economic activity when modeling policy effects on output and employment (**Evans and Honkapohla, 2009 [41]; Mehra, 2002 [58]; Thomas Jr., 1999 [68]; Gramlich, 1983 [49]**). In addition to systematic misperceptions, assessing forecasters’ uncertainty gives additional information to policy makers about the relative accuracy and relevance of predictions (**Ciccarelli and Hubrich, 2010 [20]**).

Thus, significantly “false” expectations might mislead decision makers. However, whether expectations are false might also depend on the data that is relevant for the decision maker, because initially released figures in the scheduled announcement can differ partly or substantially from last-available releases due to data revisions (**Aruoba, 2008 [7]; Faust et al. 2005 [45]; Oh and Waldman, 2005 [62]; 1990 [61]**). Therefore, since many households, financial market participants and policy makers rely on professional forecasts, it is important to know how precise these predictions are (**Croushore, 1993 [23]**). Furthermore, when evaluating forecasts, data revisions should be taken into account (**Croushore, 2011 [24]**), because accurate forecasts of the latest-available figures should be connected to a systematic misperception of the initial announcements, if the latter are revised systematically, and vice versa.

The aim of this paper is evaluating expectation accuracy of professional forecasters of U.S., European, and German macroeconomic indicators for fundamentals and monetary policy and analyzing whether forecasters’ misperceptions are affected by economic

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conditions. Moreover, an investigation of whether revisions and forecasters' misperceptions respectively show a significant time trend is made.

Before a detailed description of the used data set is provided in **section 3**, the related literature is discussed in the hereafter **section 2**. For this study, a unique data set was collected from *Bloomberg*, which contains the individual expectations of professional forecasts for 57 indicators, the initially announced figures, as well as the first and the latest revisions of those figures for the period 1999-2010. This allows studying the magnitude of data revisions and of expectation errors regarding both the initial announcement and the revised data (**section 3.2**). In order to test for forecasts' accuracy, one needs to (implicitly) assume, whether forecasters intend to predict the initial announcement or the revised values. Therefore, **section 4** analyzes whether indicators are systematically revised, and whether forecasters make systematic errors with respect to the initial announcement, the first, and the latest revisions respectively. Furthermore, the relationship between data revisions and forecast errors is presented; and the impact of economic conditions on the size of data revisions, surprises, and forecasters' uncertainty is examined. Then, **section 5** investigates the formation of expectations and the determinants of forecasters' uncertainty. Finally, **section 6** concludes.

## 2. Related Literature

False announcements of macroeconomic indicators and their revisions can have significant effects on future activity. **Oh and Waldman (1990 [61])** find that expectational shocks measured by revisions of leading economic indicators explain a substantial part of the volatility in the growth rate of industrial production. They also show that errors in initial announcements are an important source for expectational shocks which can affect aggregate activity although they do not reflect real movements in the fundamentals (**Oh and Waldman, 2005 [62]**). **Faust et al. (2005 [45])** examine the predictability of GDP revisions in G-7 countries and find that revisions are quite large and highly predictable in several countries. **Aruoba (2008 [7])** also documents that revisions of major US macroeconomic indicators are biased, which implies that the initial announcements are not rational forecasts.

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For a simple explanation of expectations formation<sup>1</sup>, **Grossman (1981 [50])** assumes that in general the economy does not waste information, and that the structure of the entire system influences expectations. He studies the rationality of money supply expectations using a survey of government dealers, which is conducted by *Money Market Services Inc.* and finds that forecasters efficiently account for available information. **Friedman (1980 [48])** finds that respondents' predictions for six market interest rates in the *Goldsmith-Nagan Bond and Money Market Letter* survey are biased and inefficient during the period 1969-1977. Quite the contrary is found by **Gramlich (1983 [49])** using data on inflationary expectations from a survey by Joseph Livingston from the *Philadelphia Inquirer*. He explicitly compares expectations of households with expectations of professional economists with respect to inflation expectations and finds that inflation expectations are both biased and inefficient, and even more so for economists than for households.

Results of more recent studies are ambiguous as well. For example, in a cross-country study of 18 countries, **Isiklar et al. (2006 [53])** evaluate the consensus forecast of annual average real GDP growth using the *Consensus Forecasts* data set. Thereby, in a GMM estimation framework they reject the hypothesis that available information is used efficiently both for the pooled data as well as for the 18 countries individually. **Dovern and Weisser (2011 [35])** analyze the accuracy, unbiasedness and efficiency of individual forecasts from a survey conducted by *Consensus Economics* and find that for the G7 countries forecasters' performances differ considerably both across countries and across the four considered macroeconomic variables (annual growth rates of the gross domestic product (GDP), private consumption, and industrial production, as well as the annual inflation rate). Using data as well from *Consensus Economics*, **Ager et al. (2009 [1])** employed a pooled approach to evaluate all forecasters simultaneously for each target variable (GDP growth and inflation) over different horizons. They show that contrary to longer horizons, consensus forecasts for a current year are in most cases unbiased. **Keane and Runkle (1990 [55])** test panel data for individual price forecasts for rationality using the *ASA-NBER* survey of professional forecasters and find them also to be rational. Moreover, they reconstruct the information set that was available to forecasters when they formed their expectations; and they cannot reject the hypothesis that only asymmetric information (and no publicly

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<sup>1</sup> For an overview of evaluation methods for forecasts see **Stekler and Petrei (2003 [65])**.

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available information) accounts for differences in individual forecasts. In contrast to most other researchers who concentrate on expectations of professional forecasters, **Carroll (2003 [16])** models and evaluates expectations data of households from the *Michigan Survey* and finds that households adjust their expectations probabilistically towards professional forecasts. The growing literature on evaluating expectations of professional forecasters, either compares forecasters' disagreements across indicators with respect to announcements (e.g. **Dovern et al., 2009 [36]**; **Fildes and Stekler, 2002 [47]**) or evaluates the impact of economists' misperception on various variables (**Öller and Barot, 2000 [63]**).

A large body of literature examines responses of financial market prices to the surprise component of *major macroeconomic announcements and monetary policy releases* (**Andersson et al. 2009 [6]**). Several studies focus on the impact of monetary policy surprises (where surprises are defined as the difference between an announced value and the median or average value expected by forecasters ("news"), divided by the standard deviation of this difference over the considered period) on interest rates (**Das, 2002 [26]**; **Valente, 2009 [72]**; **Ederington and Lee, 1993 [37]**; **Doukas and Melhem (1986 [34])**; **Urich and Wachtel, 1984a [70]** ; **Grossman, 1981 [50]** ); and more recently on global equity indexes (e.g. **Wongswan, 2009 [73]**), bond and stock markets (**Andersson, 2007 [4]**; **Beber and Brandt, 2006 [12]**; **Basistha and Kurov, 2003 [11]** **Deaves, 1990 [27]**), and foreign exchange rates (**Andersen et al. 2007 [3]**; **Faust et al., 2007 [44]**; **Andersen et al. 2003 [2]**).

**Balduzzi et al. (2001 [10], 1997 [9])** investigate the effects of scheduled macroeconomic announcements on the bond market and find that a substantial fraction of price volatility can be explained by public news announcements. **Andersen et al. (2003 [2])** find that surprises about macroeconomic announcements produce jumps of U.S. dollar spot exchange rates, where the effect of bad news is greater than the impact of good news. They also analyze the response of U.S., German and British stock, bond and foreign exchange markets to real-time U.S. macroeconomic news and identify jumps. Moreover, the response of equity markets depends on the stage of the business cycle (**Andersen et al. 2007 [3]**).

In contrast to the domestic-based research that investigates the reaction of domestic interest rates to domestic news announcements, **Becker et al. (1995 [13])**, **Ehrmann and Fratzscher (2005 [39]; 2003 [38])** and **Ehrmann et al. (2011 [40])** examine the impact of domestic macroeconomic news on interest rates in foreign countries.

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### 3. Data

The data on scheduled macroeconomic announcements and corresponding economists' expectations provided by *Bloomberg* is real-time data, for it shows the data that was available at dates in the past **Croushore (2011 [24])**. However, the structure of the *Bloomberg* data set does not follow the typical organization of real-time data sets that report for every revision the date of the revision and the initial announcement the revision refers to<sup>2</sup>. Nevertheless, thanks to the availability of the real-time announcement, and the subsequent first revision, as well as the last available revisions, observation of data revisions is possible to some extent (although data can be revised numerous times). However, there is no information on the date when the revision took place, which does not permit for monitoring periods between revisions and tracing out of the data value for particular dates.

Data for a given period are released sometime after that period has passed. Therefore, for most of the considered indicators there is a lag between the release time and the period (activity date) that the release refers to.

Column 3 in **Table 5** (see Appendix) shows the lag structure for each indicator. Most releases refer to the previous period, where periods range from one week (for Initial Jobless Claims) to one quarter (applies to GDP data predominantly). Thus, a value of  $-1$  in column 3 of **Table 5** means that announcements for *Initial Jobless Claims* apply to the actual number of people who have filed for unemployment benefits for the first time **last week**. The same value in relation to *US GDP QoQ (F)* means that announcements report the total income of everyone in the economy or the total expenditure on the economy's (final) goods and services in the **previous quarter**.

The data set consists of 57 macroeconomic indicators: 29 U.S. indicators, 16 indicators for the Eurozone and 12 German indicators for the period 1999-2010. Each release date contains the actually announced value (real-time), the first and the latest revision of the announcement, the release time, and all individual forecasts. Therefore, the median and average forecast, standard deviations of the individual forecasts for each release, standard

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<sup>2</sup> **Diebold and Rudebusch (1991 [33])** introduced the typical structure of a real-time data set as in **Croushore, 2011 [24])**.

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deviation of expectation errors over the sample period, as well as the number of estimates per release can be calculated directly.

The considered 57 economic announcements<sup>3</sup> are the broadest set of indicators than in any existing study. These releases cover six categories: Economic Activity; GDP; Employment Situation & Housing Market; Business Conditions & Consumer Confidence; Prices and Monetary Policy; and (macroeconomic) Balances. Altogether, 6,443 announcements were released, and 442 different firms and 509 economists participated in the surveys during the period 1999-2010. The number of single forecasts released per indicator over the period 1999-2010 ranges from 470 up to 20,000.

In order to capture the impact of economic conditions, dummy variables are constructed for recessions in the (a) U.S., (b) the Eurozone, and (c) Germany, as well as for a (d) high oil price and (e) volatile stock markets based on the following definitions:

- a) The Business Cycle Dating Committee of the National Bureau of Economic Research (NBER) follows the concept of the “classical business cycle” and defines a recession as:

*“A recession is a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales. A recession begins just after the economy reaches a peak of activity and ends as the economy reaches its trough. Between trough and peak, the economy is in an expansion. Expansion is the normal state of the economy; most recessions are brief and they have been rare in recent decades.” (NBER, 2008 [60]; CEPR, [18])*

Following the NBER definition for recessions<sup>4</sup> there are two recessions in the USA during the period 1999-2010: 01/2001 – 11/2001 and 12/2007 – 06/2009.

- b) For the Eurozone, the Centre of Economic Policy Research (CEPR) defines a recession that corresponds to the “growth cycle” as:

*“[...] a prolonged period of declining growth in the cyclical component of GDP (as measured by the movements of EuroCOIN). Analogously, an expansion is a prolonged period of increasing growth. Troughs and peaks are defined as the ending points of expansions and recessions respectively, i.e. as points of minimal or maximal growth.” (CEPR, [18])*

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<sup>3</sup> **Table 4** in the appendix provides definitions of the indicators.

<sup>4</sup> For problems on dating turning points, see **Stock and Watson (2010 [66])**.

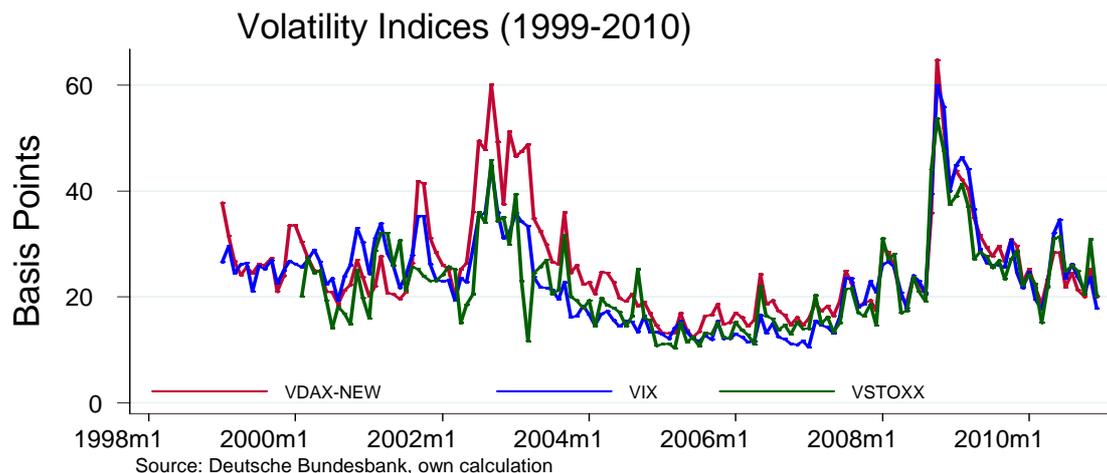
- 
- c) From the CEPR definition it follows that the Eurozone was in a recession from 01/2008 until 04/2009.
- d) Since there is no official definition for recessions in Germany, with the kind permission of the Deutsche Bundesbank, its internal definition is used. Therefore, there were two recessions in Germany during the considered period 1999-2010: 04/2000 – 06/2003 and 01/2008 – 03/2009.
- e) Data on oil price and on volatility indices are from the Deutsche Bundesbank. Volatility of equity markets, i.e. the standard deviation of returns is considered as the “fear gauge” because it measures risk (CBOE, 2009 [17]; Deutsche Börse, 2007 [31]; 2006 [30]). However, volatility of stock prices cannot be observed directly and estimation from a history of the stock price does not provide reliable estimates of future volatility. Thus, implied volatilities of options are used in practice to assess market volatility, which is the volatility implied by option prices observed in the market (McDonald, 2006 [57]; Hull, 2006 [52]).<sup>5</sup>

Based on the respective equity market, three volatility indices, which are illustrated in **Figure 1**, are used for the USA, the Eurozone and Germany:

1. Based on the DAX, the implied volatility of the German equity market is measured by **VDAX-NEW**.
2. The Chicago Board Options Exchange Volatility Index (**VIX**) measures the implied volatility of S&P 500 index options.
3. **VSTOXX** assesses the implied volatility of the EuroStoxx50.

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<sup>5</sup> Since by using the implied volatility the market price of the option is obtained, by definition it does not allow to determine whether this price is correct (McDonald, 2006 [57]).



**Figure 1: Volatility Indices for options markets S&P 500, EuroStoxx, and DAX.**

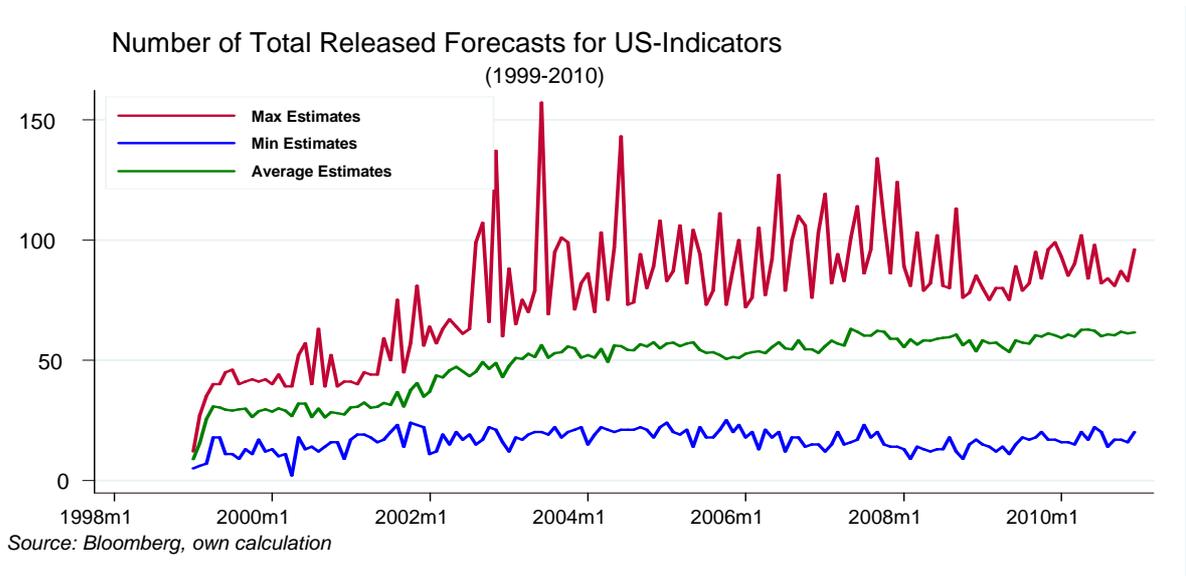
### **3.1 Descriptive statistics**

The pool of economists and institutions participating in surveys is clearly higher for U.S. indicators than for European and German indicators. **Figure 2** shows all US announcements for each month, the minimum, maximum and average number of released forecasts: The minimum and maximum numbers of released forecasts refer to all U.S. indicators, illustrating the minimum and maximum number of economists that participated in a survey of some U.S. indicator. Hence, in view of the period 1999-2010, on average, at least 17 economists<sup>6</sup> participated in a survey and this number does neither fluctuate much ( $\sigma = 12.51$ ) nor has it an obvious time trend. Contrary to the minimum, the maximum number of participating institutions has almost quintupled in 2010 as compared to 1999. On average up to 72.66 economists participate in U.S. surveys, but their number fluctuates to a larger extend ( $\sigma = 22.35$ ) ranging from 25 up to 157, at most, released estimates for the release of an indicator.

While the total average pool of participants in U.S. surveys shows a significant upward trend, this cannot be observed for economists participating in EU and DE indicator surveys. The number of economists releasing forecasts for German indicators is on a constant low level until 2002, and after a sharp increase between 2002 and 2004 – again on a constant, but on a considerably higher level until 2010. However, over the period 1999-2010 the

<sup>6</sup> In the following, I do not differentiate between institutions and economists participating in surveys.

average number of released forecasts for German indicators (25.67) is considerably lower than for U.S. indicators (49.85), but slightly higher than for European indicators (23.88)<sup>7</sup>.



**Figure 2: Number of economists or institutions participating in surveys about U.S. indicators.**

**Table 1** summarizes how many announcements were released for US indicators<sup>8</sup> during the sample period, the official announcement frequency<sup>9</sup>, the total number of forecasts, and the minimum, maximum and average number of forecasts as well as the standard deviation of participating economists per indicator over the period 1999-2010. By far, the most announcements (618) were released for *Initial Jobless Claims*, since these figures are announced weekly. Therefore, although on average only 34 economists participate in this survey, the total number of forecasts for the whole period 1999-2010 is very high (20,865 estimates). Since for the period 1999-2002 data is rarely available for European and German indicators, the total number of announcements is much higher for U.S. indicators (3,988). Hence, the total number of released forecasts for U.S. indicators (198,844) is almost six times as high as for European indicators and more than seven times higher than the number of estimates for German indicators, both because of more U.S. announcements and because of the larger pool of economists that participate in the survey on average.

<sup>7</sup> Illustration of the number of European and German economists participating in the *Bloomberg* survey are available upon request from the author.

<sup>8</sup> For European and German indicators see **Table 6** and **Table 7** in the appendix.

<sup>9</sup> Years with deviating announcement frequency (and announcement time) are listed in **Table 5** in the appendix.

**Table 1: Announcements and Forecasts for US Indicators**

Indicator	Release		Number of Forecasts				Total
	N	Frequency	Min.	Max.	Average	Std. Dev.	
US Business Inventories	133	monthly	18	61	47	10.64	6,226
US Durable Goods Orders	132	monthly	27	81	61	13.54	8,094
US Factory Orders	134	monthly	19	71	54	13.24	7,265
US Industrial Production	126	monthly	11	82	62	15.17	7,867
US Leading Indicators	124	monthly	25	63	49	11.17	6,084
US Retail Sales	100	monthly	50	83	71	7.18	7,119
US Retail Sales less Autos	98	monthly	52	78	68	5.93	6,660
US GDP QoQ (A)	46	quarterly	12	86	66	17.34	3,056
US GDP QoQ (F)	47	quarterly	33	81	61	14.10	2,850
US GDP QoQ (S)	47	quarterly	27	81	63	15.52	2,977
US Initial Jobless Claims	618	weekly	5	51	34	9.18	20,865
US Non-farm Payroll	137	monthly	11	88	65	17.82	8,952
US Building Permits	100	monthly	22	58	38	11.45	3,754
US Housing Starts	141	monthly	28	80	59	13.93	8,373
US New Home Sales	143	monthly	9	78	56	14.68	8,040
US ISM Manufacturing PMI	142	monthly	11	83	60	16.10	8,618
Philadelphia Fed Index	141	monthly	8	62	44	14.35	6,266
Chicago Purchasing Mgrs.	143	monthly	7	65	46	14.54	6,565
US Consumer Confidence	143	monthly	9	78	55	15.26	7,905
U. of Michigan Confidence	274	2 weeks	2	74	48	16.21	13,252
US CPI	123	monthly	11	82	62	16.72	7,639
US PPI	119	monthly	21	81	62	14.88	7,396
US ISM Prices Paid	108	monthly	9	25	17	3.47	1,879
US Import Price Index	115	monthly	7	58	39	13.47	4,448
Federal Funds Rate	96	irregular	10	157	80	29.90	7,713
US Consumer Credit	140	monthly	6	46	33	6.26	4,689
US Gov't Budget Balance	138	monthly	8	42	31	5.35	4,230
US Nominal Current Account	37	quarterly	26	53	42	5.82	1,560
US Trade Balance	143	monthly	11	79	59	15.03	8,502
Minimum	37		2	25	17	3	1,560
Maximum	618		52	157	80	30	20,865
Standard Deviation	102		13	22	14	5	3,701
<b>Total</b>	<b>3,988</b>				<b>49.85</b>	<b>19.28</b>	<b>198,844</b>

Source: Bloomberg, own calculation. N is the number of announcements released during 1999-2010.

With respect to U.S. indicators, on average the survey of the *Federal Funds Rate* has the most participants (80), but at the same time the standard deviation of participating economists during the period 1999-2010 is also very high ( $\sigma = 29.90$ ) for that indicator. On

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the other hand, only 17 economists participate in the survey for the indicator *US ISM Prices Paid* on average and the number of participating economists is not very volatile ( $\sigma = 3.47$ ). In general, economists release more forecasts for U.S. indicators than for European and German indicators, but the number of participating forecasters (especially the maximum) is also more volatile for U.S. indicators.

### **3.2 On the Role of Data Revisions and Forecast Errors**

**Croushore, 2011 [24]** argues that data revisions matter for monetary policy, since overreacting to current data might lead a central bank to make mistakes. On the other hand, if signals from data revisions are optimally extracted, monetary policy may not be significantly affected by data revisions. However, it is in the nature of things that policy makers' decisions are based on preliminary and partially revised data that are unequally reliable.<sup>10</sup> Hence, the following section analyses the magnitude of data revisions.

#### **3.2.1 Magnitude of data revisions**

In the first instance the magnitude of data revisions is analyzed. Here, the question is whether data revisions are more pronounced for some indicators. **Croushore (2011 [24])** suggests in his analysis of revisions that the information content of data increases during annual revisions.

Following Croushore's methodology (**Croushore, 2011 [24]**), the significance of these revisions is analyzed for the period 1999-2010: For each U.S. indicator **Table 8** (see Appendix) shows three possible revisions<sup>11</sup>: the revision from the initial release to the first revision (left panel), the revision from the first revision to the latest-available value<sup>12</sup>, and the overall revision from the initial release to the latest-available value (right panel). The first column of **Table 8** shows the data unit for all indicators. Columns 2-10 present, for each indicator, the mean and standard deviation of revisions as well as the mean absolute revision for each of three revisions to each indicator. Since indicators vary in units, revisions cannot be compared among indicators. However, the revision process is observable: most

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<sup>10</sup> A new framework for modeling data revisions is provided by **Jacobs and van Norden (2011 [54])**.

<sup>11</sup> Revision statistics for European and German indicators are provided in **Table 9** and **Table 10** in the appendix.

<sup>12</sup> The latest-available value reflects the value available at the time when the data was collected from *Bloomberg* (March, 2011).

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indicators are revised from the initial release to the first revision and then from the first revision to the last-available value in the same direction, but whether these revisions are systematic (i.e. predictable) will be discussed in the next section. For some indicators though, i.e. *Housing Starts*, *Initial Jobless Claims*, and *Non-farm Payroll*, the revision from the first revision to the last-revised values is opposite to the first revision, so that the overall revision as compared to the first revision, decreases or even inverts. Eventually, there are indicators that are not subject to revisions at all (*Federal Funds Rate*, *University of Michigan Confidence*).

Overall, it is noticeable that revisions tend to be less pronounced both for European and for German indicators as revision for U.S. indicators. Furthermore, only the second release of the Eurozone GDP is adjusted downwards, whereas revisions for other European indicators do not have consistent signs, and only interest rates announced by the ECB are not revised at all. Among German indicators all ZEW forecasts are never revised.

So far the analysis shows that in general indicators are revised more between the initial release and the first rather than between the first and the latest revision. However, there are two problems with these findings: (1) the data does not allow chasing the number and time-lag of revisions, and (2) the older the announcements, the more the data could have been revised, which would overvalue recent latest-available revisions. Nevertheless, first revisions seem to be overshooting the final values. In consequence, when evaluating the expectation accuracy regarding the initial release and the final (“true”) values, the focus is only on the initial release and the latest-available values.

### **3.2.2 Misperception magnitude**

Note that in the following the analysis focuses on the initial announcements and the latest revisions only, since analyzing economists’ misperception regarding first revisions does not seem relevant to decision makers or whether their direction occurs systematically. However, if the overall revisions are identified to be predictable, institutions that provide these data can modify their procedures for compiling the data which can eliminate the predictability.

In order to compare the degree of economists’ misperception (surprise component for indicator  $i$ :  $S_{i,t}^A = A_{i,t} - E_{i,t}$ , where  $A_{i,t}$  is the initial release, and  $E_{i,t}$  is the median forecast

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for indicator  $i$  at release date  $t$ ) regarding the initial announcement, standardized average forecast errors (Standardized Mean Absolute Surprise, MAS) are calculated for the period 2002-2010 as follows:

$$MAS_i^A = \frac{1}{T} \sum_{t=1}^T \left| \frac{S_{i,t}^A}{\sigma_i} \right|,$$

where  $\sigma_i$  is the standard deviation of  $A_{i,t} - E_{i,t}$  over the sample period. Similarly, standardized absolute average forecast errors vis-à-vis the latest revisions,  $S_{i,t}^L = R_{i,t}^L - E_{i,t}$ , are defined as

$$MAS_i^L = \frac{1}{T} \sum_{t=1}^T \left| \frac{S_{i,t}^L}{\sigma_i} \right|.$$

The ranking of economist's misperception of U.S. indicators is provided in **Figure 6** in the Appendix<sup>13</sup>. In many cases, the lower the economists' average expectation error is regarding the initial announcement, the larger it is in regard to the latest revision (e.g. *US Factory Orders*, *EU Unemployment Rate*, or *DE Unemployment Rate*) and vice versa. The comparison of  $MAS_i^L$  and  $MAS_i^A$  across countries displays that in general forecast errors for European and German indicators are larger with respect to the latest revision, whereas for U.S. indicators last-available figures are rather better predicted than initial releases. Particularly, regarding U.S. forward-looking indicators (*Chicago Purchasing Managers*, *US Consumer Confidence*, *Philadelphia Fed Index*), economists seem to forecast the latest revision better than the initial announcement, where "better" denotes that  $MAS_i^A > MAS_i^L$ .

## 4. Analysis of Data Revisions and Forecast Errors

### 4.1 Are initial announcements revised systematically?

According to decision requirements (i.e. whether real-time announcements or revised values are relevant in reaching a decision), the fact that some releases are subject to considerably large revisions should be considered both by forecasters and by policymakers. On that account, the following section investigates whether indicators with revised figures being significantly different from initial announcements are revised systematically. Whereby

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<sup>13</sup> European and German illustrations of MAS rankings are available upon request.

a revision is regarded to be significant, if for a given indicator  $i$ , the latest-revised value is significantly larger or smaller than the initial release, which is analyzed using the following regression:

$$(1) \quad (A_t^i - R_t^i) = \alpha + \varepsilon_t,$$

where  $A_t^i$  is the initial announcement for indicator  $i$  at release date  $t$  and  $\varepsilon_t$  is the error term. **Table 2** displays all indicators where final revisions are significantly different from initial announcements. A positive coefficient indicates that revised figures are on average lower than initial announcements.

**Table 2: Significant Differences between Initial Announcements and Final Revisions (2002-2010)**

	US						EU			DE	
	Building Permits	Consumer Credit	GDP QOQS	ISM Manufacturing	Initial Jobless Claims	Leading Indicators	Nominal Current Account	EU Economic Confidence	EU M3 3mth Average	EU Unempl. Rate	Unempl. Rate
Constant	-50.120*** [6.4975]	-2.494*** [0.8328]	0.603*** [0.2056]	1.025*** [0.2412]	-2.212** [0.9106]	-0.115* [0.0606]	-8.372*** [2.9900]	-0.532** [0.2452]	-0.081** [0.0370]	-0.105*** [0.0230]	-0.032** [0.0125]
Obs.	100	99	36	107	468	92	36	93	103	107	98

*Robust Standard errors in brackets. Coefficients significantly different from 0 at 1%, 5%, and 10% significance level are distinguished with \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Source: Bloomberg, own calculations.*

To assess initial announcements are also biased forecasts of the subsequent revisions, an empirical approach is applied that equals the common test of expectation unbiasedness (e.g. see **Urich and Wachtel, 1984 [71]**; **Fildes and Stekler, 2002 [47]**; **Ehrmann and Fratzscher, 2003 [38]**):

$$(2) \quad A_{i,t} = \alpha + \beta R_{i,t}^L + \varepsilon_{i,t}$$

where  $A_{i,t}$  is the real-time announcement,  $R_{i,t}^L$  is the latest revision, and  $\varepsilon_{i,t}$  is the unobservable error term for indicator  $i$  at release date  $t$ .

A Wald test is implemented to test the joint hypothesis that the revised values equal the initially announced values. Formally, this is test by the following hypothesis:

---


$$H_0: \alpha = 0 \text{ and } \beta = 1.^{14}$$

Thus, revisions of indicators show a significantly systematic pattern if the joint hypothesis has to be rejected. The results are presented in **Table 11** in the Appendix. Each panel shows the estimated coefficients of the constant and the slope parameter (column 1 and 2, respectively), and the corresponding robust standard errors are denoted in brackets. Column 3 in each panel displays the p-values of the Wald test. Most indicators fail the Wald test, which means that initial announcements are biased forecasts.

#### **4.2 The relationship between misperceptions and revisions**

Though the previous section has shown that data is partially significantly revised, it is not clear a priori, whether economists are attempting to forecast the initial release or the latest-revised figures. Therefore, the magnitude of economists' misperception vis-à-vis the initial announcement is evaluated first, and vis-à-vis the latest revision thereafter.

The rational expectations hypothesis implies that the released and the expected values must be identical except for completely random disturbance, or that the expectations are unbiased (**Figlewsky and Wachtel, 1981 [46]**). Following the terminology in the literature, expectations are biased<sup>15</sup> with respect to the initial release, if the joint null hypothesis  $H_0: (\alpha, \beta) = (0, 1)$  has to be rejected for the regression

$$(3) \quad A_{i,t} = \alpha + \beta E_{i,t}^A + \varepsilon_{i,t},$$

where  $A_{i,t}$  is the initial announcement for indicator  $i$  at release date  $t$  and  $E_{i,t}^A$  is the corresponding median expectation<sup>16</sup>, and  $\varepsilon_{i,t}$  is a white noise disturbance term. Accordingly, expectations regarding the latest revision  $E_{i,t}^{RL}$  are unbiased if the joint null hypothesis  $H_0: (\alpha, \beta) = (0, 1)$  cannot be rejected for

$$(4) \quad R_{i,t}^L = \alpha + \beta E_{i,t}^{RL} + \varepsilon_{i,t}.$$

---

<sup>14</sup> The joint hypothesis is not a necessary but sufficient condition for revision "unbiasedness" (**Fildes and Stekler, 2002 [47]**).

<sup>15</sup> Unbiasedness is a necessary condition for partial rationality, which means that information is used efficiently (**Brown and Maital, 1981 [14]**).

<sup>16</sup> The same regression was also run with average expectations, however results do not differ much (results are available upon request).

**Table 3** has two panels corresponding to the regressions in **Equation (3)** and **Equation (4)** for median expectations about U.S. indicators during the period 2002-2010. The Breusch-Pagan/Cook-Weisberg test is implemented to test for heteroskedasticity ( $H_0$ : constant variance of residuals) and has to be rejected for most indicators at the 5% significance-level. Hence, for these estimations heteroskedasticity-robust standard errors are obtained, and also used to compute  $t$  statistics and confidence intervals.

**Table 3: Test of unbiasedness of median forecasts for U.S. indicators**

Dependent Variable Explanatory Variable	Actual Announcement				Latest Revision			
	Median Estimate				Median Estimate			
	$\alpha$	$\beta$	$p$	$R^2$	$\alpha$	$\beta$	$p$	$R^2$
<i>Indicators</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Building Permits	-25.2382* [12.0587]	1.0187* [0.0091]	0.11 -	0.99	-5.5124 [9.8788]	1.0402* [0.0065]	0.00 (+++)	1.00
Business Inventories	-0.0097 [0.0248]	1.1021* [0.0486]	0.10 (+)	0.84	-0.0541 [0.0310]	1.3843* [0.0626]	0.00 (+++)	0.83
CPI	-0.0464* [0.0208]	1.2214* [0.0666]	0.00 (+++)	0.90	-0.0294 [0.0321]	0.9898 [0.0866]	0.50 -	0.60
Chicago Purch. Mgrs.	0.8083 [3.0283]	1.0031 [0.0568]	0.07 (+)	0.72	-3.5236 [1.8434]	1.0775* [0.0340]	0.00 (+++)	0.91
Cons. Conf.	-1.0994 [2.1338]	1.0114 [0.0232]	0.87 -	0.95	-0.9862 [1.1336]	1.0203 [0.0133]	0.03 (++)	0.98
Consumer Credit	-0.1304 [0.8530]	0.9431 [0.1297]	0.72 -	0.36	0.9573 [0.5794]	1.3673* [0.0956]	0.00 (+++)	0.66
Durable Goods Orders	-0.2376 [0.2459]	1.3599* [0.1628]	0.09 (+)	0.46	0.3034 [0.3477]	-0.4206* [0.2124]	0.00 (+++)	0.04
Factory Orders	-0.0059 [0.0727]	1.0316 [0.0477]	0.80 -	0.88	0.2783 [0.2149]	0.0005* [0.1153]	0.00 (+++)	0.00
Federal Funds Rate	-0.0055 [0.0107]	0.9985 [0.0038]	0.34 -	1.00	-0.0055 [0.0100]	0.9985 [0.0035]	0.35 -	1.00
GDP QoQ A	0.0058 [0.2782]	0.9577 [0.0879]	0.60 -	0.91	-0.3953 [0.2979]	1.0439 [0.0865]	0.36 -	0.82
GDP QoQ F	0.0525 [0.0443]	0.9716* [0.0114]	0.05 (+)	0.99	0.0367 [0.0667]	0.9663 [0.0179]	0.13 -	0.99
GDP QoQ S	-0.0074 [0.0888]	1.0205 [0.0270]	0.46 -	0.99	-0.3295 [0.2675]	0.9033 [0.0747]	0.01 (++)	0.81
Gov't Budget Balance	2.9074 [1.4877]	1.0344* [0.0165]	0.04 (++)	0.96	-44.8878* [9.0240]	0.0317* [0.1003]	0.00 (+++)	0.00
Housing Starts	-13.2372 [17.5438]	1.0141 [0.0149]	0.62 -	0.97	0.0098 [14.8641]	1.0171 [0.0098]	0.00 (+++)	0.99
ISM Manufact. PMI	1.2179 [1.7352]	0.9816 [0.0325]	0.41 -	0.89	2.9801* [1.2562]	0.9286* [0.0237]	0.00 (+++)	0.94
ISM Prices Paid	3.2178 [2.5054]	0.9626 [0.0380]	0.20 -	0.86	2.0419 [2.4311]	0.9802 [0.0378]	0.28 -	0.86
Import Price Index	0.005 [0.0759]	1.1978* [0.0942]	0.01 (++)	0.87	0.1007 [0.1273]	0.9575 [0.1000]	0.71 -	0.50
Ind. Production	-0.1207* [0.0759]	1.3310* [0.0942]	0.02 (++)	0.73	-0.1011 [0.1273]	0.7105 [0.1000]	0.03 -	0.17

**Continuing Table 3:**

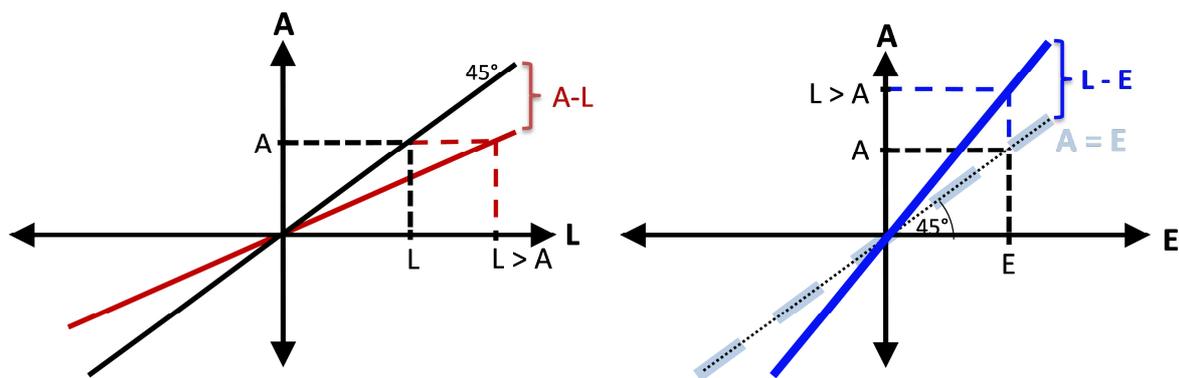
	[0.0502]	[0.1134]	(++)		[0.0787]	[0.1618]	(++)	
Jobless Claims	2.9689	0.9961	0.18	0.95	2.9874	1.0017	0.00	0.98
	[4.5118]	[0.0120]	-		[2.4423]	[0.0061]	(+++)	
Leading Indicators	-0.018	1.1810*	0.00	0.89	0.1790*	0.6329*	0.00	0.19
	[0.0173]	[0.0452]	(+++)		[0.0546]	[0.1347]	(+++)	
New Home Sales	-14.6718	1.0226	0.52	0.96	-7.5208	1.0052	0.71	0.98
	[13.8751]	[0.0197]	-		[11.7070]	[0.0127]	-	
Nom. Current Account	-5.5295	0.9598	0.36	0.97	-12.3668	0.8634	0.00	0.80
	[5.2642]	[0.0326]	-		[12.0431]	[0.0741]	(+++)	
Non-farm Payroll	-17.1212*	0.9404	0.02	0.86	-35.0182*	1.1187*	0.00	0.79
	[7.8842]	[0.0382]	(++)		[11.9361]	[0.0574]	(+++)	
PPI	-0.049	1.4992*	0.00	0.77	0.0794	0.6075*	0.03	0.17
	[0.0604]	[0.1309]	(+++)		[0.0865]	[0.1429]	(++)	
Phil. Fed Index	-0.5281	0.9832	0.65	0.76	-1.1777*	1.0421	0.07	0.92
	[0.9631]	[0.0535]	-		[0.5118]	[0.0307]	(+)	
Retail Sales	0.008	1.0686	0.65	0.66	0.2036	0.2421*	0.00	0.03
	[0.0659]	[0.0915]	-		[0.1207]	[0.1528]	(+++)	
Retail Sales ex Autos	-0.0858	1.3699	0.11	0.56	0.0435	0.9483	0.92	0.18
	[0.0898]	[0.2030]	-		[0.1036]	[0.2048]	-	
U. of Michigan Conf.	2.6312*	0.9645*	0.05	0.94	2.6312	0.9645*	0.04	0.94
	[1.3327]	[0.0162]	(++)		[1.3751]	[0.0166]	(++)	
US Trade Balance	-1.3328	0.9726	0.53	0.93	-0.2964	0.9893	0.54	0.96
	[1.2529]	[0.0244]	-		[0.9613]	[0.0191]	-	

Source: Bloomberg, own calculation.

Note: \* indicates that the null hypothesis  $H_0: \alpha = 0$  OR  $H_0: \beta = 1$  have to be rejected at a 5% significance level. If the Wald test of the joint hypothesis  $H_0: \alpha = 0$  AND  $H_0: \beta = 1$  has to be rejected is visualized by (+), (++) and (+++) which corresponds to 10%, 5%, and 1% significance level. Brackets denote heteroskedasticity-robust standard errors.

The joint null hypothesis (column 3 shows the p-values of the Wald test) has to be rejected for the estimation regarding the latest revision twice as often (22/29) as in the regression concerning initial releases (11/29). Therefore, forecasts about the “final” values are systematically biased for 75% of U.S. indicators. However, if both separate conditions are applied to the joint hypothesis  $H_0: (\alpha, \beta) = (0, 1)$ , the overall more restrictive condition (three different tests) leaves forecasts for three out of 29 U.S. indicators being biased (*US CPI, Industrial Production, and University of Michigan Confidence*) concerning the initial release and 4/29 biased forecasts with respect to the latest revisions. Moreover, for none of the indicators the restrictive condition is rejected both regarding the initial announcement *and* the last-available release. This relationship is illustrated schematically in **Figure 3**.

If, for example, economists attempt to forecast the initial release, they will *underestimate* the latest revision the more the initial announcement is revised *upwards*. In contrast, if *ceteris paribus* economists are attempting to forecast the latest revision, they will *overestimate* the initial announcement.



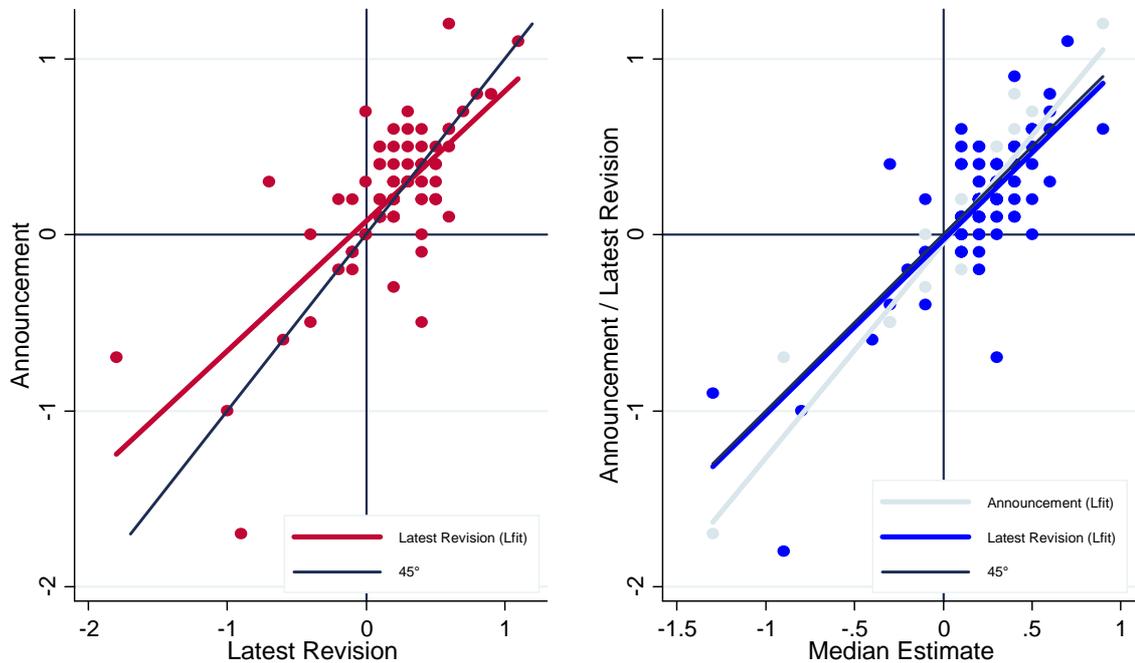
**Figure 3: Schematic view of a systematic revision and a corresponding systematic misperception**

The left diagram in **Figure 4** visualizes that *US CPI* is revised systematically between the initial announcement  $A$  and the latest revision  $L$ , whereby the latest values are systematically larger (both in the positive as well as in the negative direction, i.e. positive releases are revised upwards and negative releases are adjusted downwards). At the same time, the right hand side diagram shows the relationship between the median forecast  $E$  and the initial release (light blue OLS fitted line), and the latest revision (navy OLS fitted line).<sup>17</sup> The OLS fitted line for the regression in **Equation (4)** nearly equals the 45°-curve, thus the median estimate for *US CPI* is unbiased with respect to the latest revision, which corresponds to a systematic *underestimation* concerning the initial release (as the slope parameter is significantly larger than one), because it is systematically adjusted *upwards*. Since *US CPI* is revised systematically (see **Table 11** in the Appendix) and given that forecasters strive to predict the “final” values, their forecasts must be systematically biased with respect to the initial release.

With three indicators out of 15, forecasts for European indicators are comparably rare in bias regarding initial announcements when testing the joint null hypothesis; and the more restrictive condition indicating systematic economists’ misperception only for initial releases of *EU PPI* and *EU GDP (Advanced)*. In contrast, with the latest revisions, twice as many median forecasts are biased according to the joint null hypothesis.

<sup>17</sup> For the left hand side diagram the 45°-curve illustrates graphically the equality of initial announcements and the latest revisions, whereas in the right hand side diagram the 45°-curve illustrates graphically the equality of the x- and y-axes.

## Scatterplots for US CPI 2002-2010



Source: Bloomberg, own calculation.

**Figure 4: Scatterplots and OLS fitted lines for US CPI**

The results of the *forecast analysis* of German indicators (see **Table 13** in the Appendix) differ from findings regarding U.S. indicators in **Table 3** and European indicators in **Table 12** (see in the Appendix): Although for *DE PPI*, *DE Retail Sales*, *DE Current Account*, and *DE Trade Balance* the combined conditions<sup>18</sup> have to be rejected in the *revision analysis* (see **Table 11** in the Appendix), which means that these indicators are systematically revised from initial announcement to the latest revision, the evaluation of the *corresponding forecasts with respect to the latest revisions* shows that the joint hypothesis has to be rejected only for *DE Retail Sales*. These findings suggest for German indicators, that forecasters that are (assumably) aiming to predict the latest revisions for certain indicators are able to form better forecasts if these indicators are revised systematically. Though to a lower extent, this relationship is also observable regarding U.S. indicators.

<sup>18</sup> The joint hypothesis and the two separate conditions are considered simultaneously.

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Generally speaking, for one third of German indicators the joint null hypotheses can be rejected with respect to the latest revisions, revealing these forecasts to be biased. With respect to European indicators, forecasters show systematic misperceptions for 37.5% of the latest revisions; but only 24% of U.S. forecasts are unbiased. Therefore, when evaluating forecast accuracy, decision makers should take into account whether announcements are revised systematically and whether economists aim at forecasting the initial release or the latest revision.

### **4.3 The impact of economic conditions on revisions and surprises**

#### **4.3.1 Do revisions depend on economic conditions?**

The previous analysis has shown that some releases are revised systematically and that these revisions are also economically significant. In the following a model is specified that investigates whether revisions are induced by economic conditions (recessions, highly volatile stock markets, and a high oil price). Since announcements that are released at release date  $t$  refer to a reporting period ( $rp$ ) that for most indicators differs from the release date ( $t \neq rp$ ), economic conditions during the reporting period are presumed to impact later revisions. Therefore, for each country, dummy variables are constructed in the following manner:

Stock markets in country  $c$  are defined to be highly volatile at release date  $t$  if the implied volatility (as measured by the respective volatility index, as described in [section 3](#)) exceeds the average volatility  $\mu$  by more than two standard deviations. Both the average volatility  $\mu$  and  $\sigma(implVol^c)$  are calculated over the period 2002-2010.

$$vol_t^c = \begin{cases} 0, & implVol_t^c < \mu + 2 * \sigma(implVol^c) \\ 1, & implVol_t^c \geq \mu + 2 * \sigma(implVol^c) \end{cases}$$

A dummy for a high oil price is defined analogically to volatile stock markets:

$$hOil_t = \begin{cases} 0, & OilPrice_t < \mu + 2 * \sigma(OilPrice) \\ 1, & OilPrice_t \geq \mu + 2 * \sigma(OilPrice). \end{cases}$$

Definitions in [section 3](#) are used to construct dummy variables for recessions, where the dummy takes a value of one during the respective recessions, and zero otherwise. In order that the impact is comparable across indicators, revisions are standardized:

$$R_{i,t}^{AL} = \frac{A_{i,t} - R_{i,t}^L}{\sigma_i}$$

where  $R_{i,t}^{AL}$  is the standardized revision between the announcement  $A$  for indicator  $i$  at release date  $t$  and the last revision of *that* figure  $R_{i,t}^L$ .

In order to examine the impact of *current* economic conditions on revisions, the following specifications are considered:

$$(5) \quad R_{i,t}^{AL} = \alpha + \beta_1 resUS_t + \beta_2 volUS_t + \beta_3 resEU_t + \beta_4 volEU_t + \beta_5 resDE_t + \beta_6 volDE_t + \gamma hOil_t + \varphi release\_date_t + \varepsilon_{i,t}$$

The regressions in **Equation (5)** analyze the impact of recessions ( $resUS_t$ ,  $resEU_t$ , and  $resDE_t$ ) and volatile stock markets ( $volUS_t$ ,  $volEU_t$ , and  $volDE_t$ ) in all countries as well as a high oil price  $hOil_t$  at release date  $t$  on the standardized revision  $R_{i,t}^{AL}$  at release date  $t$ . A time trend, implemented by the respective release date  $release\_date_t$ , is also included in these specifications. Standardized revisions are not affected by economic conditions, and do not have a time trend if  $H_0: (\alpha, \beta_1, \dots, \beta_6, \gamma, \varphi = 0)$  is rejected.

The results for U.S. indicators are presented in **Table 14** (see Appendix). Regarding  $R_{i,t}^{AL}$  a slightly positive significant time trend can be observed for *Building Permits*, *Consumer Credit*, and *Leading Indicators*, whereas standardized revisions of *ISM Manufacturing PMI* decline over time. On the contrary, standardized revisions  $R_{i,t}^{AL}$  for *Nominal Current Account* are (statistically and economically significantly) positively affected by U.S. economic conditions (column 2) and a volatile S&P 500 (column 3), and negatively by a volatile EuroStoxx50 (column 5). Volatile U.S. stock markets have a significantly positive and European stock markets significantly negative impact on standardized revisions of *US Trade Balance*. Finally, in the course of the first and the latest revision *Non-farm Payroll* is significantly adjusted downwards during U.S. recessions and when the DAX is volatile (column 7); whereas the overall revision of *Non-farm Payroll* is positively related to recessions in Germany. However, in general, most revisions are neither affected by economic conditions nor by volatile stock markets. The coefficient of a high oil price (column 8) is never statistically significant for  $R_{i,t}^{AL}$ .

Among indicators for the Eurozone almost all explanatory variables have a mostly negative significant (statistically and economically) impact on revisions of *EU Economic Confidence*. The time trend is also significant but positive. Revisions of other European

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indicators are hardly (economically) significantly affected at all. The same holds for all German indicators<sup>19</sup>.

Then, in order to gauge a possible impact of economic conditions that were effective *during the period the releases refer to* on revisions of these announcements at  $t$ , the following specifications are used:

$$\begin{aligned}
 R_{i,t}^{AL} = & \alpha + \beta_1 resUS_{rp} + \beta_2 volUS_{rp} + \beta_3 resEU_{rp} + \beta_4 volEU_{rp} \\
 (6) \quad & + \beta_5 resDE_{rp} + \beta_6 volDE_{rp} + \gamma hOil_{rp} + \varphi release\_date_t \\
 & + \varepsilon_{i,t}
 \end{aligned}$$

where the subscripts  $rp$  denote the reporting period.

The results show that although lagged explanatory variables explain more latest revisions of European indicators than in the previous specifications with current economic conditions, their explanatory power again does not seem to be economically significant. Revisions of German indicators, however, cannot be explained better by using lagged dummies for economic condition. Among US indicators, *Non-farm Payroll* is the most revised (as to the revision magnitude) indicator and its revisions seem to be predictable to some extent. Revisions of most other indicators, however, cannot be explained well by economic conditions, volatile stock markets, or a high oil price; and a clear time trend is also not observable.<sup>20</sup>

### **4.3.2 Detecting surprise determinants**

In this section the determinants of economists' misperceptions are analyzed. The main questions are: (1) Are initial releases more unexpected when stock markets are volatile or during recessions? (2) Has the surprise component decreased over time?

Thus, for each indicator, the average standardized surprises ( $S_i^A$  and  $S_i^L$ , respectively) are explained by dummy variables for contemporaneous recessions, highly volatile stock exchanges, a high oil price and a time trend.

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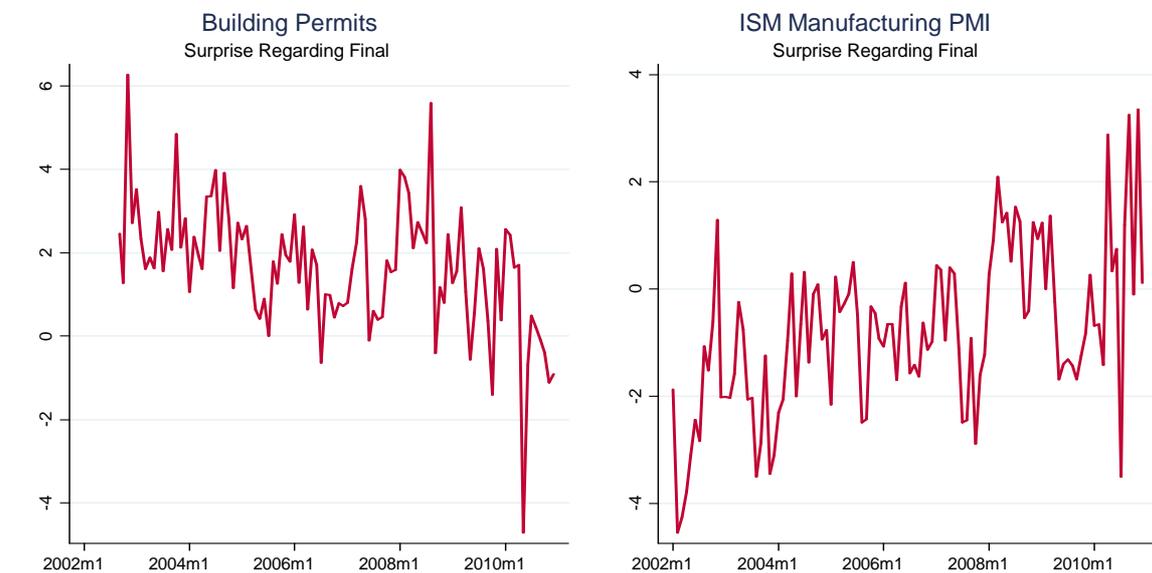
<sup>19</sup> Results for European and German indicators are not displayed and available upon request.

<sup>20</sup> To save space, results are not displayed.

$$(7) \quad S_t^A = \alpha + \beta_1 resUS_t + \beta_2 volUS_t + \beta_3 resEU_t + \beta_4 volEU_t + \beta_5 resDE_t + \beta_6 volDE_t + \gamma hOil_t + \varphi release\_date_t + \varepsilon_t$$

$$(8) \quad S_t^L = \alpha + \beta_1 resUS_t + \beta_2 volUS_t + \beta_3 resEU_t + \beta_4 volEU_t + \beta_5 resDE_t + \beta_6 volDE_t + \gamma hOil_t + \varphi release\_date_t + \varepsilon_t$$

Results for the two regressions for US indicators are presented in **Table 15** and **Table 16** in the Appendix<sup>21</sup>. In general, experts' surprises both about initial releases and the latest revisions of U.S. indicators are more often influenced by business conditions than surprises about European or German indicators. For example, forecasters are more surprised about the announcement of *US CPI* in times of a volatile S&P 500 (column 3) and a high oil price (column 8), whereas their standardized surprise declines during recessions in the Eurozone. In regard to a time trend results are ambiguous, since surprises about some indicators decline over time (e.g. *Building Permits*), while forecasters are more surprised about other indicators (e.g. *ISM Manufacturing PMI*) in the period 2002 through 2010 (see column 9 in **Table 15** and **Figure 5** for an illustration). However, the overall evidence on the effects of the dummy variables is mixed and unclear in both regressions.



Source: Bloomberg, own calculation

**Figure 5: Significant Time Trend for Selected Indicators**

<sup>21</sup> Results for European and German indicators are available upon request.

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#### 4.4 Determinants of uncertainty

Thanks to the used data, the impact of economic conditions on forecasters' uncertainty concerning the initial announcement  $A_{i,t}$  for indicator  $i$  at release date  $t$ , which is measured by *standard deviations of individual forecasts*  $\sigma_{i,t}$  at release date  $t$ , can be conducted. Expectations are assumed to be more volatile during recessions, when stock markets are volatile, or the oil price is elevated, due to increased uncertainty about the state of the economy. Furthermore, economic conditions during the reporting period are expected to have an impact on  $\sigma_{i,t}$  rather than economic conditions that are valid when the announcement is released. Moreover, in order to capture the relationship between the number of participating economists and their uncertainty about the outcome of the respective announcements, this variable is also included. Therefore, dummy variables are used for recessions in the USA, the Eurozone, and Germany during the reporting period ( $resUS_{rp}$ ,  $resEU_{rp}$ ,  $resDE_{rp}$ ) and during the month the announcement was released ( $resUS_t$ ,  $resEU_t$ ,  $resDE_t$ ); dummy variables for a high oil price during the reporting period ( $hOil_{rp}$ ) and during the month the announcement was released ( $\gamma_1 hOil_t$ ), and the number of participating economists in the survey for indicator  $i$  at release date  $t$  ( $NumEstimates_{i,t}$ ). In the first step, uncertainty about the announcement for domestic indicators is analyzed using dummy variables for US, European, German economic conditions, respectively. Therefore, the following three regressions are estimated:

$$(9) \quad \sigma_{i,t} = \alpha + \beta_1 resUS_t + \beta_2 volUS_t + \beta_3 resUS_{rp} + \beta_4 volUS_{rp} + \gamma_1 hOil_t + \gamma_1 hOil_{rp} + \varphi NumEstimates_{i,t} + \varepsilon_{i,t}$$

$$(10) \quad \sigma_{i,t} = \alpha + \beta_1 resEU_t + \beta_2 volEU_t + \beta_3 resEU_{rp} + \beta_4 volEU_{rp} + \gamma_1 hOil_t + \gamma_1 hOil_{rp} + \varphi NumEstimates_{i,t} + \varepsilon_{i,t}$$

$$(11) \quad \sigma_{i,t} = \alpha + \beta_1 resDE_t + \beta_2 volDE_t + \beta_3 resDE_{rp} + \beta_4 volDE_{rp} + \gamma_1 hOil_t + \gamma_1 hOil_{rp} + \varphi NumEstimates_{i,t} + \varepsilon_{i,t}$$

where  $\varepsilon_{i,t}$  is the error term.

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**Table 17** shows for the impact of U.S. economic conditions that only uncertainty about *US PPI* significantly increases if during the month when *US PPI* was announced the US economy experienced a recession (column 2). However, uncertainty about current announcements for *Factory Orders*, *GDP*, *Industrial Production*, *Nominal Current Account*, *Retail Sales*, and *US Trade Balance* increases in times of a currently volatile S&P 500 (column 3). As expected, the dummy variable that indicates a recession in the U.S. (a volatile stock market) during the reporting period has a positive and significant sign for six (seven) out of 24 announcements (see column 4 and 5, respectively). While per indicator, both recession dummies are never significant, uncertainty about *Retail Sales* and *US Trade Balance* is positively affected both by a currently volatile stock market and high volatility during the reporting period. In general, forecasters seem to be more uncertain about current announcements if there was a recession during the reporting period and the stock market was volatile. In contrast, both dummy variables for a high oil price (column 6) are never significant, whereas only uncertainty about the announcement for *ISM Manufacturing PMI* decreases if the oil price was high during the reporting period (column 7). Though the coefficient of the number of participating forecasters is significant for eleven out of 24 indicators, the relationship is ambiguous (column 8).

Surprisingly, if the Eurozone currently experiences a recession, forecasters are less uncertain concerning the announcement of *EU M3 3mth avg.*, but more uncertain if there was a recession during the reporting period. However, a currently volatile EuroStoxx50 rarely increases uncertainty, whereas disagreement about the advanced release of Eurozone GDP decreases if the Eurozone experienced a recession during the reporting period. A currently high oil price rather decreases uncertainty concerning a European announcement, while the coefficient of the number of participating economists is not significant.

In contrast, economic conditions in Germany do not influence uncertainty about German announcements. Uncertainty increases about the outcome of *DE Retail Sales* and *DE Trade Balance* if Germany experiences a recession; and a German recession during the reporting period raises uncertainty about the advanced GDP release, German industrial production, and the producer price index in Germany.<sup>22</sup>

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<sup>22</sup> Results for European and German indicators are not reported, but available upon request from the author.

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Since the analysis points to a stronger impact of economic conditions during the reporting period, and uncertainty especially about German announcements is not explained by domestic economic conditions, it is also examined if domestic economic conditions impact uncertainty about foreign releases. Estimating the following specification

$$(12) \quad \sigma_{i,t} = \alpha + \beta_1 resUS_{rp} + \beta_2 volUS_{rp} + \beta_3 resEU_{rp} + \beta_4 volEU_{rp} + \beta_5 resDE_{rp} + \beta_6 volDE_{rp} + \gamma hOil_{rp} + \varphi NumEstimates_t + \varepsilon_t$$

indicates that uncertainty about U.S. announcement tends to decrease if during the reporting period Germany experienced a recession (for result see **Table 18** in the Appendix), while economic conditions in the Eurozone seem not to be strongly related to expectation uncertainty about U.S. indicators in contrast to some German and Eurozone announcements.

## 5. Expectations Formation and Uncertainty

### 5.1 Rational expectations

Expectations are denoted “rational”, if “expectations of [...] the subjective probability distribution of outcomes tend to be distributed, for the same information set, about the prediction of [...] the “objective” probability distributions of outcomes (**Muth, 1961 [59]**, p. 316).”<sup>23</sup> **Dovern und Weisser, 2011 [35]** point out that forecast accuracy is assumed to be the only objective of forecasters and that only true expectations are published. Although, forecasters might also e.g. want to gain maximal public attention which would provide an incentive to over- or underestimate outcomes, such arguments have little weight because the data set reveals the identities of the panelists.

**DeCanio (1979 [28])** argues that “rational expectations” as defined by **Muth (1961 [59])** require unreasonably high costs if a forecaster was to collect *all* necessary information. Thus, recent models of expectations formation consider that after weighing costs and benefits, agents rationally decide to restrict their information set to information they are likely to acquire (**Demery and Duck, 2007 [29]**). Following **DeCanio (1979 [28])**, the operational

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<sup>23</sup> For another testing procedure see **Clements and Taylor (2001 [21])**.

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significance of the rational expectations idea can be improved by specifying some methods of learning. For example, an error-learning model as in **Gramlich, 1983 [49]** could be applied. Therefore, since (adaptive) learning also implies more persistent data than models with rational expectations, the former is used in forward-looking models (**Chevillon et al., 2010 [19]**).

The *extrapolative* and the *adaptive* hypotheses are the two mostly used expectations hypotheses in the literature on expectations formation (e.g. **Hafer, 1983 [51]**; **Tanzi, 1980 [67]**; **Turnovsky, 1970 [69]**; **Muth, 1961 [59]**). The *extrapolative hypothesis* is based on the estimation of

$$(13) \quad E_{i,t} = \alpha + \beta_1 A_{i,t-1} + \beta_2 (A_{i,t-1} - A_{i,t-2}) + \varepsilon_{i,t}$$

where  $E_{i,t}$  is the median expectation for indicator  $i$  at time  $t$  (which is formed between  $t - 1$  and  $t$ );  $A_{i,t-1}$  is the announced growth rate of indicator  $i$  in  $t - 1$ , the term  $(A_{i,t-1} - A_{i,t-2})$  corresponds to the trend in growth rates during the previous period, and  $\varepsilon_t$  is a white noise error term. The original version of this hypothesis is consistent with the analysis in **section 4** and stipulates  $H_0: (\alpha, \beta_1 = 0, 1)$ . In case that  $H_0: \beta_2 > 0$  is not rejected, the forecaster is expecting the past trend to continue and is hence extrapolating the past trend. In contrast, not rejecting  $H_0: \beta_2 < 0$  corresponds to forecaster's expectations being regressive, i.e. he expects the past trend to reverse itself, whereas  $H_0: (\alpha = \beta_2 = 0, \beta_1 = 1)$  is related to static expectations.

The *adaptive hypothesis* assumes that when forming the actual expectation, the forecaster adds a fraction  $\tau$  of his latest forecast error to his latest expectation (see also e.g. **Figlewski and Wachtel, 1981 [46]**; **Carlson and Parkin, 1975 [15]**):

$$(14) \quad E_t - E_{t-1} = \tau(A_{t-1} - E_{t-1}) \quad 0 \leq \tau \leq 1.$$

However, this formulation implies that if there is a trend in the announced growth rates, forecasters systematically underestimate the actual announcement in  $t$ . However, this is accounted for by estimating

$$(15) \quad E_t = \alpha + \beta_1 E_{t-1} + \beta_2 A_{t-1} + \varepsilon_t,$$

which is equivalent to **Equation (14)** if  $H_0: \beta_1 + \beta_2 = 1$  and  $\alpha = 0$  is not rejected. In case that  $H_0: \beta_1 + \beta_2 > 1$  cannot be rejected, the forecaster would presume a maintained trend

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and thus continue elevating his expectations above his previous forecast (even if forecasts last year were realized and  $\alpha = 0$ ). The opposite is the case if  $H_0: \beta_1 + \beta_2 < 1$  is not rejected.

**Table 19** (see Appendix) presents the estimation results of **Equation (13)** and **Equation (15)**. Concerning extrapolative expectations (left panel), the null hypothesis  $H_0: \beta_2 < 0$  (see column 5) cannot be rejected for five (mainly for U.S.) out of 15 analyzed indicators, indicating that forecasts about these indicators are regressive, i.e. forecasters expect the latest trends of U.S. business inventories, U.S. and German industrial production, U.S. retail sales (without autos) and leading indicators to reverse itself. In contrast, concerning  $H_0: \beta_2 > 0$  (see column 4) when forming their expectations, forecasters extrapolate the latest trends of ISM prices paid, German retail sales, and German and Eurozone unemployment rates. Moreover, forecasters' expectations about nearly all indicators are biased as to  $H_0: (\alpha, \beta_1 = 0, 1)$  is rejected for almost all indicators (see columns 1 and 2), and forecasters never expect trends to be static (see column 6). Column 12 in the right hand side panel of **Table 19** shows the results for adaptive expectations. For all indicators, apart from the Eurozone unemployment rate, forecasters expect reversed trends in the announced growth rates so that they lower their forecasts.

The same analysis is also done for expectations concerning latest-available releases (for results see **Table 20** in the Appendix). Obviously, in general the formation of expectations for the latest revision does not differ from expectations formation concerning the initial announcement. However, forecasters seem to change their expectations formation about the European unemployment rate when forecasting the latest revisions. While forecasters extrapolate the trend in initial announcements, they expect a regressing trend in the latest revisions (see columns 4 and 5 in **Table 19** and **Table 20**, respectively). Similarly, when testing the adaptive hypothesis, the analysis using the latest revisions shows that in contrast to the initial announcement, forecasters expect the latest revision to follow the previous trend and therefore they raise their expectations.

## 6. Concluding Remarks

For this paper a unique data set has been collected that allowed analyzing individual economists' forecasts regarding major macroeconomic indicators. In general, economists

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release more forecasts for U.S. indicators than for European and German indicators, but the number of participating forecasters (especially the maximum) is also more volatile for U.S. indicators.

First, the magnitude of data revisions has been examined and the relationship between initial announcements, revised data and expectations has been presented. The empirical analysis has shown that announcements are partly considerably revised, and that some revisions occur systematically. At the same time, forecasters' expectation errors are also systematic for a number of indicators. The comparison of standardized surprises across countries displays that in general, forecast errors for European and German indicators are larger with respect to the latest revision, whereas for U.S. indicators last-available figures are rather better predicted than initial releases.

Evaluating the impact of economic conditions on revisions yields no significant relationships; and the overall evidence on the effects of economic conditions on surprises is mixed and unclear. However, concerning forecasters' uncertainty about announcements, recessions and volatile stock markets seem to have a positive impact, i.e. economists are more uncertain during recessions and when stock markets are volatile.

In general, the formation of expectations for the latest revision does not differ from expectations formation concerning the initial announcement. In addition, the analysis shows that forecasters that are (assumably) aiming to predict the latest revisions of German indicators are able to form better forecasts if these indicators are revised systematically. Though to a lower extent, this relationship is also observable regarding U.S. indicators. Therefore, when evaluating forecast accuracy, decision makers should take into account whether announcements are revised systematically and whether economists aim at forecasting the initial release or the latest revision. Further research, using this data set as a panel, would allow investigating whether the assumption is reliable that forecast accuracy is the only objective of forecasters, and that only true expectations are published.

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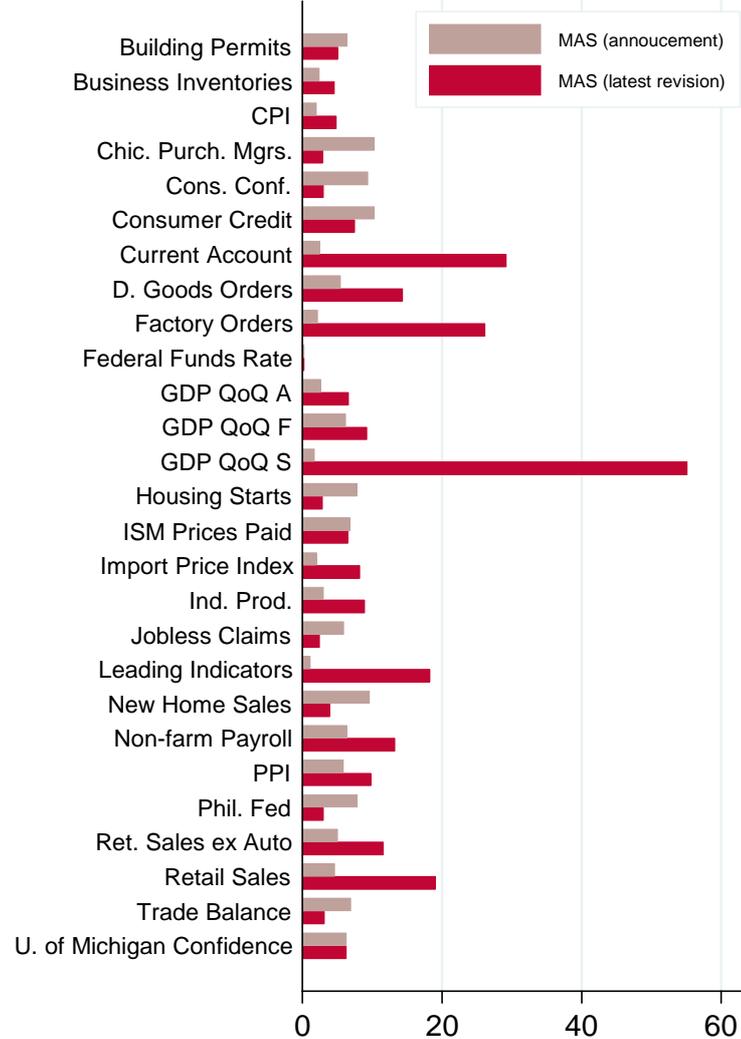
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## APPENDIX

## Mean Standardized Absolute Surprises (MAS)

US Indicators (2002-2010)



Source: Bloomberg, own calculation.

Figure 6: Mean Squared Surprises of US Indicators

**Table 4: Description of Indicators**

<b>Indicator</b>	<b>Unit</b>	<b>Description</b>
<b><i>Economic Activity</i></b>		
US Business Inventories	%	Percentage change of goods and materials held available in stock by U.S. business.
US Durable Goods Orders	%	Data from the Census Bureau's report on durable goods, manufacturers' shipments, inventories and orders.
US Factory Orders	%	Percentage change of new orders reported by U.S. manufacturers.
US Industrial Production	%	This industrial production data is seasonally adjusted. The production index measures real output and is expressed as a percentage of real output in a base year, currently 2007. The production indexes are computed as Fisher indexes since 1972; the weights are based on annual estimates of value added.
US Leading Indicators	%	Base year 2004 = 100. This index is composed of: (1) Average weekly hours, manufacturing (27.37%); (2) Average weekly initial jobless claims (3.22%); (3) Manufacturers' new orders, consumer (8.17%); (4) Vendor performance, slower deliveries (7.17%); (5) Manufacturers' new orders, capital (1.95%); (6) Building permits, new private housing units (2.64%); (7) Stock prices, 500 common stocks (3.7%); (8) Money supply, M2 (32.3%); (9) Interest rate spread (10.52%); (10) Index of consumer expectations (2.96%).
US Retail Sales	%	Adjusted for seasonal variation, for holiday and trading day differences, but not for price changes.
US Retail Sales less Autos	%	Adjusted for seasonal variation, for holiday and trading day differences, but not for price changes.
EU Industrial Production	%	This data is the volume index of production and includes mining and quarrying, manufacturing, electricity, gas and water supply. Base year 2005 = 100, seasonally adjusted.
EU Retail Sales	%	The index of deflated turnover for retail trade shows the monthly activity in volume of retail trade, except of motor vehicles and motorcycles. It is a short-term indicator for final domestic demand. Base year 2005 = 100.
DE Industrial Production	%	The overall index includes: mining, electricity and gas supply, manufacturing and construction indices. Figures are seasonally adjusted; base year 2005 = 100.
DE Retail Sales	%	German Retail Sales, base year 2005 = 100. Seasonally adjusted.
<b><i>GDP</i></b>		
US GDP QoQ (A)	%	Advanced release for the U.S. gross domestic product (GDP).
US GDP QoQ (S)	%	Second release for the U.S. gross domestic product (GDP).

**Continuing Table 4:**

US GDP QoQ (F)	%	Third release (final). GDP equals the total income of everyone in the economy or the total expenditure on the economy's (final) goods and services.
EU GDP QoQ (A)	%	Advanced release for the gross domestic product (GDP) in the Eurozone.
EU GDP QoQ (S)	%	Second release for the gross domestic product (GDP) in the Eurozone.
EU GDP QoQ (F)	%	Final figures. Real Eurozone GDP (quarter on quarter %). The data is seasonally adjusted and at market prices.
DE GDP QoQ (A)	%	Advanced release for the German gross domestic product (GDP).
DE GDP QoQ (F)	%	Final figures. Real German GDP (quarter on quarter %). The data is seasonally and working days adjusted. Base year 2000 = 100.
<b><i>Employment Situation &amp; Housing Market</i></b>		
US Initial Jobless Claims	K	Weekly initial jobless claims in the actual number of people who have filed for Unemployment benefits for the first time.
US Non-farm Payroll	K	In June 2003, all figures from the establishment survey were converted from the Standard Industrial Classification (SIC) over to the North American Industry Classification System (NAICS). As a result, new categories were created and all history was revised.
US Building Permits	K	As per the U.S. Commerce Department's Bureau of the Census, private residential real estate activity in thousands of units. Seasonally adjusted rates.
US Housing Starts	K	Private residential real estate activity in thousands of units. Seasonally adjusted rates. This index tracks new privately owned housing units started.
US New Home Sales	K	Median sales and average sales for new one-family houses in dollars. Data is seasonally adjusted annual rates, put out by the U.S. Dept. Of Commerce's bureau of the Census and the U.S. Dep't of Housing and Urban Development.
EU Unemployment Rate	%	The basis for the calculation of a monthly unemployment rate is the Community Labour Force Survey, where the main statistical objective is to classify the population in employed, unemployed and inactive groups.
DE Unemployment Rate	%	German Unemployment Rate, as a percentage of the total labour force, including both West and East Germany. Figures are seasonally adjusted.

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**Continuing Table 4:**

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<b><i>Business Conditions &amp; Consumer Confidence</i></b>		
US ISM Manufacturing PMI	P	ISM indices compare the changes in various market areas on a month to month basis.
Philadelphia Fed Index	P	Federal Reserve Bank of Philadelphia: Business outlook survey diffusion. Each January seasonally adjusted history is revised.
Chicago Purchasing Mgrs.	P	The index is compiled by the Purchasing Managers Association of Chicago and is released for every month on the last day of that month. If more firms report improved business conditions than deteriorating business conditions, the index is above 50.
US Consumer Confidence	R	Average of responses to the following five questions (response options: Positive, Negative, Neutral): (1) Respondents appraisal of current business conditions. (2) Respondents expectations regarding business conditions six month hence. (3) Respondents appraisal of the current employment conditions. (4) Respondents expectations regarding employment conditions six month hence. (5) Respondents expectations regarding their total family income six month hence.
U. of Michigan Confidence	P	A survey (conducted by the University of Michigan) of consumer attitudes regarding both the present situation as well as expectations concerning economic conditions.
EU Consumer Confidence	P	This indicator represents the arithmetic average of the balances of four questions: the financial situation of households, the general economic situation, unemployment expectations (with inverted sign) and savings, all over the next 12 month.
EU Economic Confidence	P	The monthly economic sentiment indicator reflects general economic activity of the EU. This indicator combines assessments and expectations stemming from business and consumer surveys, which include various components of the economy: industry, consumers, construction and retail trade. In August 2003 the base year was changed from 1995 to 2000.
EU Business Climate	P	European Commission Euro Area Business Climate Indicator.
EU Industrial Confidence	P	Respondents answer questions about their current and future expectation of industry. Weightings are given to answers based on importance. Respondents can either give positive or negative answers.

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Continuing Table 4:

ZEW EU Expectations	P	This indicator measures the expectations of future economic growth in the Euro-zone within the next six month. It represents the difference between positive and negative responses in a survey of about 350 institutional investors and analysts.
Ifo Business Climate	P	The Ifo Business Climate index is based on approx. 7,000 monthly survey responses of firms in manufacturing, construction, wholesale and retail. The firms can characterize their situation concerning the current business situation as "good", "satisfactory" or "poor" and their expectations for the next six month as "more favorable", "unchanged" or "more unfavorable".
ZEW DE Current Situation	P	Assessment of the current economic situation in Germany, conducted by the ZEW (Centre for European Economic Research).
ZEW DE Expectation	P	Expectation of economic growth for Germany, conducted by the ZEW (Centre for European Economic Research).
<b><i>Prices &amp; Monetary Policy</i></b>		
US CPI	%	The Consumer Price Index (CPI) represents changes in prices of all goods and services purchased for consumption by urban households, user fees, and sales and excise taxes paid by the consumer. The CPI represents the expenditures of about 80% of the total U.S. population.
US PPI	%	Producer Price Index (PPI) measure average changes in prices received by domestic producers of commodities in all stages of processing, imports are not included. Each month approximately 100,000 prices are collected from 30,000 participating establishments.
US ISM Prices Paid	%	The ISM index includes prices paid for all purchases including import purchases and purchases of food and energy excluding crude oil.
US Import Price Index	%	Base year 2000 = 100.
Federal Funds Rate	%	Usually members of the Federal Open Market Committee determine the federal funds target rate about eight times a year.
EU CPI (HICP)	%	Harmonized Consumer Price Index; Base year 2005 = 100. The Eurozone is treated as a separate entity by Eurostat. The Eurozone consists of 11 member states up until 31 December 2000, then 12 members as of January 1st 2001 when Greece joined.
EU PPI	%	Producer Price Index (PPI) for the total industry: monthly % changes, seasonally adjusted.

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**Continuing Table 4:**

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ECB Announ. Interest Rates	%	Announcements of the base borrowing rate.
EU M3	%	ECB M3 annual growth rate, seasonally adjusted.
EU M3 3mth avg	%	M3 money supply 3 month moving average.
DE CPI	%	German Consumer Price Index (CPI), base year 2005 = 100.
DE PPI	%	German Producer Price Index (PPI)
<hr/> <b>Balances</b>		
US Consumer Credit	\$ B	Most short-term and intermediate-term credit extended to individuals are covered by this index. Loans secured by real estate are not included.
US Gov't Budget Balance	\$ B	This statement summarizes the financial activities of the Federal Government and off-budget federal entities conducted in accordance with the budget of the U.S. Government. Major sources include accounting data reported by federal entities, disbursing officers, and Federal Reserve banks.
US Nominal Current Account	\$ B	US nominal account balance in Billions of USD.
US Trade Balance	\$ B	Balance of payments. Total trade balance = Goods + Services.
DE Current Account	€ B	German current account, including former East Germany. Last figures are subject to significant uncertainty owing to changes in method of data collection in foreign trade.
DE Trade Balance	€ B	German Trade Balance, not seasonally adjusted.

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*Source: Descriptions are mainly taken from Bloomberg.*

*Note: B=Billion, K=Thousand, P=Points, R=Rate.*

Table 5: The Economic Calendar 1999-2010

<i>USA</i>	<i>Frequency</i>	<i>Unit</i>	<i>Lag</i>	<i>Period</i>	<i>Deviation*</i>	<i>Time (MEZ)</i>	<i>Deviation**</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Leading Indicators	m	%	-1	1999-2010			
Fed Funds Rate (FOMC)	irregular	%	0	1999-2010	2001	20:15	2010-2006 2003-2001 1999
<i>Economic Activity</i>							
Industrial Production (MoM) sa (2007=100)	m	%	-1	1999-2010	-	15:15	2010-2007
Factory Orders	m	%	-2	1999-2010	-	16:00	2010 2007-2002 2000-1999
Durable Goods Orders	m	%	-1	1999-2010	2000	14:30	2010-2008 2002-2000
Business Inventories	m	%	-2	2003-2010	2007	16:00	2009-2007 2005-2003
				1999-2002	-	14:30	
GDP QoQ Advance (annualized)	q	%	-1	1999-2010	-	14:30	2010-2005 2000-1999
GDP QoQ Second (annualized)	q	%	-1	1999-2010	-	14:30	2010-2005 2000-1999
GDP QoQ Final (annualized)	q	%	-1	1999-2010	-	14:30	2010-2005 2000-1999
<i>Employment Situation &amp; Business Conditions</i>							
Non-farm Payroll	m	K	-1	1999-2010	-	14:30	2005-2002 1999
Initial Jobless Claims	w	K	-1	1999-2010	1999	14:30	2010-1999
Philadelphia Fed Index	m	P	0	2008-2010	-	16:00	2010-2008
				2002-2007	-	18:00	
				1999-2001	-	16:00	
ISM Prices Paid	m	%	-1	2001-2010	-	16:00	2007 2005-2002
ISM Manufacturing PMI	m	P	-1	1999-2010	-	16:00	2010 2005-2002 1999
Chicago Purchasing Managers Index SA	m	P	0	2007-2010	-	15:45	2009-2007
				1999-2006	-	16:00	2006-2003 2000-1999
<i>Prices</i>							
US CPI Urban Consumers (MoM) SA	m	%	-1	1999-2010	-	14:30	2010-2007
PPI (MoM)	m	%	-1	1999-2010	-	14:30	2010-2007 2004 1999
Import Price Index MoM	m	%	-1	1999-2010	2000-2001	14:30	2010-2007 1999
<i>Housing Market &amp; Retail Sector</i>							
Housing Starts	m	K	-1	1999-2010	-	14:30	2010-2007
New Home Sales	m	K	-1	1999-2010	1999	16:00	2010-2008 2000-1999

## Continuing Table 5:

Building Permits	m	K	-1	2003-2010	-	14:30	2010-2007
Retail Sales MoM	m	%	-1	2002-2010	-	14:30	2009-2007
Retail Sales less Autos MoM	m	%	-1	2002-2010	-	14:30	2009-2007
<i>Consumer Confidence</i>							
Consumer Confidence SA	m	R	0	1999-2010	-	16:00	2009-2004 2002-1999
U. of Michigan Confidence	2w*	P	0	2000-2010	2000-2001	15:45-16:00	2010-2000
<i>External Sector</i>							
Consumer Credit Net Monthly Chg.	m	\$B	-2	1999-2010	-	21:00	
US Nominal Current Account	q	\$B	-1	2001-2010	-	14:30	2010-2007
				1999-2000	-	16:00	2000
US Trade Balance	m	\$B	-2	1999-2000	-	14:30	2009-2008
Gov't Budget Balance	m	\$B	-1	1999-2010	1999	20:00	2009-2007 2004, 2002 2000-1999
<i>Eurozone</i>							
ECB Refi Rate	m / 2w	%	0	2001-2010		13:45	2008, 2002
<i>Economic Activity</i>							
Real GDP Advance (QoQ) sa	q	%	-1	2002-2010	2006 2003-2002	11:00	
Real GDP Preliminary (QoQ) sa	q	%	-1	2002-2010	2006 2003-2002	11:00	
Real GDP Final (QoQ) sa	q	%	-1	2004-2010	2006 2003-2002	11:00	2004
Industrial Production (MoM) sa	m	%	-2	2004-2010	-	11:00	2004
				2002-2003	-	12:00	
Trade Balance	m	€Mio.	-2	2004-2010	2009, 2004	11:00	2004
<i>Prices</i>							
Euro-zone CPI (HICP)	m	%	-1	2002-2010	-	11:00	2004
				2002-2003	-	12:00	
PPI MoM	m	%	-2	2004-2010	-	11:00	2004
<i>Employment Situation &amp; Business Conditions</i>							
Unemployment Rate	m	%	-1****	2004-2010	-	11:00	2004
				2002-2003	-	12:00	2002
EU Bus. Climate Index	m	P	0	2004-2010	2005-2004	11:00	2004
				2002-2003	2003-2002	12:00	
ZEW Survey	m	P	0	2004-2010	2004	11:00	
Economic Confidence Index	m	P	0	2003-2010	2005-2003	11:00	
Industrial Confidence Index	m	P	0	2003-2010	2005-2003	11:00	
Consumer Confidence Index	m	€B	0	2004-2010	2005-2004	11:00	2004
				2003	2003	12:00	
<i>Retail Sector</i>							
Retail Sales (MoM)	m	%	-2	2004-2010	-	11:00	2004
				2001-2003	2003	12:00	

Continuing Table 5:

<i>Monetary &amp; Financial Sector</i>							
M3 Money Supply (YoY)	m	%	-1	2002-2010	-	10:00	
M3 Money Supply (YoY) 3 Month Mov. Avg. SA	m	%	-1	2002-2010	2002	10:00	
<i>Germany</i>							
Real GDP Preliminary (QoQ)	q	%	-1	2004-2010	2005	8:00	2005
Real GDP Final (QoQ)	q	%	-1	1999-2010	2005 2001	8:00	2005
CPI MoM	2w	%	0 / -1***	2003-2010	2008 2005-2003		
PPI MoM	m	%	-1	1999-2010	1999	8:00	
Unemployment Rate	m	%	0	2001-2010	2001	9:55	2005-2001
Industrial Production (MoM) sa	m	%	-2	1999-2010	2005-1999	12:00	2005-1999
Factory Orders (MoM) sa	m	%	-2	1999-2010	2006-1999	12:00	2010
IFO Business Climate Index (2000=100)	m	P	0	2004-2010	2004	10:00	
ZEW Survey Index	m	P	0	2002-2010	2002	11:00	
ZEW Current Situation Index	m	P	0	2004-2010	2004	11:00	
Retail Sales MoM	m	%	-2	2000-2010	2005-2002	8:00	2001-2000
Current Account	m	€B	-2	2002-2010	2009 2003-2002	8:00	
Trade Balance	m	€B	-2	2002-2010	2002	8:00	

*Note: m = monthly, w = weekly, q = quarterly, P = Points, R = Rate. \* The first release is the preliminary value, while the second release is the revised (final) figure. \* Years where the release frequency deviates from the usual frequency during the period in column (4). \*\* Years where the release time deviates from the usual release time in column (6). \*\*\* Preliminary figures for a month are released during that month; final figures for that month are released in the next month. \*\*\*\* Often figures are released late so that at the beginning of a month figures are announced for the next to last month and at the end of the same month last-month-figures are released.*

**Table 6: Announcements and Forecasts for EU Indicators (1999-2010)**

Indicator	Release		Number of Forecasts				
	N	Frequency	Min.	Max.	Average	Std. Dev.	Total
EU Industrial Production	94	monthly	5	43	29	8.98	2,697
EU Retail Sales	87	monthly	3	29	17	6.37	1,495
EU GDP QoQ (A)	32	quarterly	10	42	31	8.70	991
EU GDP QoQ (S)	38	quarterly	5	39	27	9.63	1,021
EU GDP QoQ (F)	27	quarterly	4	38	25	10.13	669
EU Unemployment Rate	125	monthly	7	36	24	7.95	3,021
EU Consumer Confidence	104	monthly	12	40	27	7.06	2,849
EU Economic Confidence	93	monthly	9	33	23	5.77	2,119
EU Business Climate	90	monthly	2	19	10	3.97	934
EU Industrial Confidence	89	monthly	12	38	28	6.17	2,489
ZEW EU Expectations	78	monthly	3	12	6	1.78	462
EU CPI	106	monthly	6	37	26	8.01	2,772
EU PPI	101	monthly	6	31	21	6.88	2,110
ECB Announ. Interest Rates	123	2 weeks	14	68	39	14.81	4,851
EU M3	108	monthly	10	39	27	7.08	2,942
EU M3 3mth avg.	105	quarterly	5	27	19	4.21	2,003
Minimum	27		2	12	6	2	462
Maximum	125		14	68	39	15	4,851
Standard Deviation	30		4	12	8	3	1,140
<b>Total</b>	<b>1,400</b>				<b>23.88</b>	<b>11.13</b>	<b>33,425</b>

Source: Bloomberg, own calculation.

Note: Due to data availability European and German indicators are considered since 2002.

**Table 7: Announcements and Forecasts for DE Indicators (1999-2010)**

Indicator	Release		Number of Forecasts				
	N	Frequency	Min.	Max.	Average	Std. Dev.	Total
DE Industrial Production	78	monthly	21	46	36	5.61	2,837
DE Retail Sales	96	monthly	3	36	18	9.33	1,757
DE GDP QoQ (A)	29	quarterly	24	45	37	4.63	1,066
DE GDP QoQ (F)	26	quarterly	15	40	33	4.99	861
DE Unemployment Rate	105	monthly	5	37	27	8.02	2,848
IFO Business Climate	82	monthly	20	46	40	4.24	3,246
ZEW DE Current Situation	83	monthly	8	25	18	3.95	1,512
ZEW DE Expectation	104	monthly	8	44	34	8.47	3,525
DE CPI	132	monthly	11	39	27	6.11	3,610
DE PPI	114	monthly	6	37	25	6.98	2,836
DE Current Account	100	monthly	6	18	11	2.90	1,080
DE Trade Balance	106	monthly	3	25	18	4.17	1,918
Minimum	26		3	18	11	3	861
Maximum	132		24	46	40	9	3,610
Standard Deviation	32		7	9	9	2	1,005
<b>Total</b>	<b>1,055</b>				<b>25.67</b>	<b>10.64</b>	<b>27,096</b>

Source: Bloomberg, own calculation.

Note: Due to data availability European and German indicators are considered since 2002.

**Table 8: Revision Statistics for US Indicators (1999-2010)**

INDICATOR	Unit (1)	REVISIONS FROM								
		Initial Release to First Revision			First Revision to Last Revision			Initial Release to Last Revision		
		Mean (2)	Stand. Dev. (3)	Mean absolute revision (4)	Mean (5)	Stand. Dev. (6)	Mean absolute revision (7)	Mean (8)	Stand. Dev. (9)	Mean absolute revision (10)
Building Permits	K	-23.45	69.05	57.57	-26.67	28.77	30.27	-50.12	64.98	64.42
Business Inventories	%	0.03	0.32	0.22	-0.04	0.23	0.17	-0.01	0.41	0.33
CPI	%	0.01	0.10	0.01	0.03	0.26	0.15	0.03	0.28	0.16
Chicago Purchasing Mgrs.	P	0.05	1.07	0.27	0.14	4.42	3.21	0.18	4.53	3.41
Consumer Confidence	P	-0.91	6.52	4.84	-0.03	0.28	0.03	-0.94	6.51	4.83
Consumer Credit	\$ B	-0.60	7.86	6.31	-2.06	4.68	4.05	-2.66	7.78	6.44
Durable Goods Orders	%	-0.08	6.41	4.67	-0.06	2.20	1.48	-0.14	6.32	4.64
Factory Orders	%	-0.03	3.71	2.66	-0.01	1.65	1.06	-0.04	3.73	2.71
Federal Funds Rate	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GDP QoQ A	%	0.11	1.21	0.43	0.09	0.93	0.34	0.20	1.21	0.45
GDP QoQ F	%	0.00	0.00	0.00	0.06	0.31	0.06	0.06	0.31	0.06
GDP QoQ S	%	0.01	0.07	0.01	0.51	1.37	1.03	0.52	1.38	1.04
Gov't Budget Balance	\$ B	-0.02	9.92	1.82	-0.93	105.06	80.17	-0.95	105.81	81.47
Housing Starts	K	-14.21	103.01	76.84	4.32	32.24	22.13	-9.89	105.00	79.95
ISM Manufacturing PMI	P	0.02	0.37	0.07	0.76	2.47	1.86	0.78	2.49	1.90
ISM Prices Paid	%	0.10	1.03	0.10	-0.03	0.64	0.08	0.07	1.21	0.18
Import Price Index	%	-0.03	1.27	0.88	-0.02	0.55	0.26	-0.05	1.36	1.00
Industrial Production	%	0.04	0.76	0.49	0.03	0.42	0.29	0.07	0.84	0.60
Initial Jobless Claims	K	-2.36	20.56	14.98	0.61	12.33	8.59	-1.75	20.09	15.22
Leading Indicators	%	-0.04	0.51	0.34	-0.08	0.34	0.26	-0.11	0.59	0.49
New Home Sales	K	0.63	67.49	49.78	12.94	36.75	29.73	13.57	71.02	55.63
Nominal Current Account	\$ B	-0.32	17.56	11.89	-7.76	7.08	8.30	-8.08	17.78	15.55
Non-farm Payroll	K	-5.23	144.67	105.04	8.88	99.39	75.23	3.64	147.28	116.21
PPI	%	0.04	0.22	0.04	0.00	0.97	0.59	0.04	0.99	0.63
Philadelphia Fed Index	P	-0.05	4.16	0.88	0.15	8.76	6.37	0.09	9.58	7.11
Retail Sales	%	-0.01	1.45	1.05	0.00	0.58	0.37	0.00	1.53	1.16
Retail Sales less Autos	%	-0.11	1.00	0.72	0.10	0.41	0.28	0.00	1.08	0.81
U. of Michigan Confidence	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
US Trade Balance	\$ B	-0.30	3.29	2.29	0.12	2.27	1.40	-0.18	3.73	2.77

Source: Bloomberg, own calculation.

Note: Indicators that are never revised are highlighted blue.

**Table 9: Revision Statistics for Eurozone Indicators (1999-2010)**

Indicator	Unit	REVISIONS FROM									
		<u>Initial Release to First Revision</u>			<u>First Revision to Last Revision</u>			<u>Initial Release to Last Revision</u>			
		Mean	Std. Dev.	Mean absolute revision	Mean	Std. Dev.	Mean absolute revision	Mean	Std. Dev.	Mean absolute revision	
ECB Announ. Interest Rates	%	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EU Business Climate	P	0.01	0.28	0.20	-0.01	0.15	0.10	0.00	0.25	0.18	
EU CPI	%	0.00	0.12	0.04	0.00	0.00	0.00	0.00	0.12	0.04	
EU Cons. Confidence	P	0.03	1.09	0.53	0.00	0.14	0.02	0.03	1.10	0.55	
EU Econ. Confidence	P	-1.22	3.16	2.28	0.69	2.09	1.25	-0.53	2.36	1.48	
EU GDP A	%	-0.01	0.06	0.02	0.01	0.08	0.03	0.00	0.13	0.04	
EU GDP F	%	-0.03	0.10	0.05	0.03	0.11	0.04	-0.01	0.14	0.07	
EU GDP S	%	-0.02	0.15	0.10	-0.01	0.05	0.02	-0.03	0.16	0.11	
EU Ind. Prod.	%	0.00	1.31	1.03	-0.03	0.51	0.34	-0.03	1.28	1.02	
EU Ind. Confidence	P	-0.09	1.08	0.55	0.01	0.24	0.07	-0.07	1.07	0.54	
EU M3	%	-0.03	0.47	0.34	0.00	0.12	0.04	-0.03	0.45	0.33	
EU M3 3mth avg	%	-0.08	0.42	0.34	0.01	0.12	0.04	-0.07	0.38	0.30	
EU PPI	%	-0.01	0.49	0.36	0.00	0.04	0.02	-0.02	0.48	0.35	
EU Retail Sales	%	-0.04	1.08	0.85	0.05	0.40	0.32	0.01	1.05	0.80	
EU Unempl. Rate	%	-0.07	0.34	0.26	0.02	0.22	0.10	-0.06	0.27	0.18	
ZEW EU Expectation	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Source: Bloomberg, own calculation.

**Table 10: Revision Statistics for German Indicators (1999-2010)**

Indicator	Unit	REVISIONS FROM								
		<u>Initial Release to First Revision</u>			<u>First Revision to Last Revision</u>			<u>Initial Release to Last Revision</u>		
		Mean	Std. Dev.	Mean absolute revision	Mean	Std. Dev.	Mean absolute revision	Mean	Std. Dev.	Mean absolute revision
DE CPI	%	0.00	0.00	0.00	0.01	0.07	0.01	0.01	0.07	0.01
DE Curr. Account	€ B	-0.49	4.81	3.67	0.46	1.20	0.74	-0.03	4.82	3.74
DE GDP QOQ A	%	-0.12	0.41	0.26	0.14	0.97	0.46	0.02	1.00	0.56
DE GDP QOQ F	%	0.00	0.00	0.00	-0.09	0.36	0.09	-0.09	0.36	0.09
DE Ind. Production	%	-0.01	2.28	1.76	0.04	0.60	0.39	0.03	2.42	1.88
DE PPI	%	0.02	0.41	0.20	0.00	0.00	0.00	0.02	0.41	0.20
DE Retail Sales	%	-0.14	2.42	1.77	0.36	1.88	1.21	0.22	3.04	2.33
DE Trade Balance	€ B	0.01	2.91	2.14	0.03	0.60	0.26	0.05	2.95	2.24
DE Unempl. Rate	%	-0.03	0.13	0.08	0.00	0.02	0.00	-0.03	0.12	0.07
IFO Busin. Climate	P	0.18	1.49	1.13	0.03	0.31	0.12	0.21	1.54	1.18
ZEW Current Situation	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ZEW Expectation	P	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Bloomberg, own calculation.

Table 11: Systematic Revisions, 2002-2010

<i>US Indicators</i>					<i>EU Indicators</i>				
	$\alpha$	$\beta$	$p$	$R^2$		$\alpha$	$\beta$	$p$	$R^2$
Building Permits	-15.7634 [16.5993]	0.9765* [0.0105]	0.00 (+++)	0.99	EU GDP A	0.0036 0.0255	0.9833 0.0359	0.90 -	0.96
Business Inventories	0.0638 [0.0334]	0.6457* [0.0458]	0.00 (+++)	0.66	EU GDP S	-0.0033 0.0275	0.9141* 0.0384	0.06 (+)	0.94
CPI	0.0761* [0.0318]	0.7354* [0.0735]	0.00 (+++)	0.53	EU GDP F	-0.0016 0.0266	0.9628 0.0352	0.56 -	0.97
Chicago Purch. Mgrs.	7.7214* [3.1327]	0.8643* [0.0570]	0.05 (++)	0.69	EU CPI	0.0175 0.0123	0.9459 0.0320	0.19 -	0.90
Consumer Confidence	2.0254 [2.3641]	0.9652 [0.0275]	0.20 -	0.92	EU PPI	0.0752 0.0459	0.5486* 0.0746	0.00 (+++)	0.37
Consumer Credit	0.5589 [0.8150]	0.4554* [0.0807]	0.00 (+++)	0.23	EU Unempl. Rate	-0.7307* 0.2426	1.0730* 0.0282	0.00 (+++)	0.93
Durable Goods Orders	0.1685 [0.3132]	-0.2121* [0.0890]	0.00 (+++)	0.05	EU Business Climate	0.0015 0.0273	1.0101 0.0209	0.89 -	0.96
Factory Orders	0.1376 [0.2058]	0.0587* [0.0953]	0.00 (+++)	0.00	EU Ind. Prod.	-0.0415 0.0997	0.1556* 0.1005	0.00 (+++)	0.03
GDP QoQ A	0.6131* [0.2091]	0.8014* [0.0589]	0.00 (+++)	0.85	EU Economic Confidence	-2.5654 2.2581	1.0208 0.0230	0.07 (+)	0.96
GDP QoQ F	0.0231 [0.0385]	1.0023 [0.0106]	0.61 -	1.00	EU Indust. Confidence	-0.1029 0.1394	0.9963 0.0104	0.76 -	0.99
GDP QoQ S	0.7501* [0.2491]	0.9196 [0.0770]	0.01 (++)	0.81	EU Consumer Confidence	0.034 0.2667	1.0004 0.0168	0.96 -	0.97
Gov't Budget Balance	-48.7441* [9.0786]	0.0088* [0.1020]	0.00 (+++)	0.00	EU Retail Sales	0.0619 0.0773	-0.3100* 0.1279	0.00 (+++)	0.07
Housing Starts	3.155 [29.7343]	0.9856 [0.0192]	0.21 -	0.96	EU M3	-0.0502 0.1096	0.9999 0.0142	0.50 -	0.98
ISM Manufact. PMI	1.3069 [2.1902]	0.9947 [0.0419]	0.00 (+++)	0.84	EU M3 3mth avg	-0.0763 0.0940	0.9994 0.0122	0.10 -	0.99
ISM Prices Paid	1.2064* [0.5071]	0.9821* [0.0078]	0.06 (+)	0.99					
Import Price Index	0.1198 [0.1328]	0.5900* [0.0769]	0.00 (+++)	0.39					
Industrial Production	0.1122 [0.0697]	0.2334* [0.0887]	0.00 (+++)	0.07					
Initial Jobless Claims	4.0385 [4.3043]	0.9842 [0.0106]	0.02 (++)	0.95	DE GDP QOQ A	0.1077 0.1647	0.5429* 0.1459	0.02 (++)	0.34
Leading Indicators	0.0547 [0.0505]	0.2989* [0.0810]	0.00 (+++)	0.12	DE GDP QOQ F	-0.0668 0.0739	0.9331 0.0639	0.28 -	0.90
New Home Sales	1.7807 [19.6075]	1.007 [0.0214]	0.54 -	0.96	DE CPI	0.0089 0.0065	0.9787 0.0173	0.29 -	0.96
Nom. Current Account	-23.4242 [11.9877]	0.8987 [0.0782]	0.01 (++)	0.80	DE PPI	0.0985* 0.0460	0.6361* 0.0790	0.00 (+++)	0.43
Non-farm Payroll	11.433 [11.3149]	0.6762* [0.0436]	0.00 (+++)	0.70	DE Unemployment Rate	-0.0098 0.0872	0.9978 0.0089	0.05 (++)	0.99
PPI	0.2082* [0.1014]	0.3082* [0.1169]	0.00 (+++)	0.07	DE Industrial Production	0.0066 0.2200	0.1610* 0.1266	0.00 (+++)	0.02
Philadelphia Fed Index	0.9697 [0.9396]	0.8777* [0.0534]	0.07 (+)	0.72	IFO Business Climate	1.281 2.3059	0.9891 0.02	0.44 -	0.96
Retail Sales	0.2563* [0.1031]	0.0028* [0.0870]	0.00 (+++)	0.00	DE Retail Sales	-0.3688* 0.1800	-0.4536* 0.1187	0.00 (+++)	0.16
Retail Sales less Autos	0.2789* [0.0801]	0.1392* [0.0833]	0.00 (+++)	0.03	DE Current Account	4.2959* 0.8338	0.5010* 0.0834	0.00 (+++)	0.27
US Trade Balance	-2.7413 [1.5621]	0.9481 [0.0312]	0.22 -	0.90	DE Trade Balance	6.2529* 1.1116	0.5187* 0.0840	0.00 (+++)	0.27

Source: Bloomberg, own calculation.

Note: \* indicates that the null hypotheses  $H_0: \alpha = 0$  OR  $H_0: \beta = 1$  have to be rejected at a 5% significance level. If the Wald test of the joint hypothesis  $H_0: \alpha = 0$  AND  $H_0: \beta = 1$  has to be rejected is visualized by (+), (++) and (+++) which correspond to 10%, 5%, and 1% significance level. The p-values refer to the Wald test. OLS standard errors are displayed in brackets. Indicators that are never revised are not considered (Federal Funds Rate, "University of Michigan Confidence", "ZEW EU Expectations", "ECB Announ. Interest Rates", "ZEW DE Expectations", "ZEW DE Current Situation").

**Table 12: Test of unbiasedness of median forecasts for European indicators (2002-2010)**

Dependent Variable Explanatory Variable	Actual Announcement				Latest Revision			
	Median Estimate				Median Estimate			
<i>Indicators</i>	$\alpha$ (1)	$\beta$ (2)	$p$ (3)	$R^2$ (4)	$\alpha$ (5)	$\beta$ (6)	$p$ (7)	$R^2$ (8)
ECB Interest Rates	0.013 [0.0108]	0.9957 [0.0033]	0.42 -	1.00	0.013 [0.0106]	0.9957 [0.0040]	0.47 -	1.00
EU GDP A	-0.0463* [0.0212]	1.1687* [0.0358]	0.00 (+++)	0.97	-0.039 [0.0387]	1.1361* [0.0629]	0.11 -	0.92
EU GDP S	0.0047 [0.0053]	1.0039 [0.0036]	0.48 -	1.00	0.0223 [0.0290]	1.0373 [0.0437]	0.38 -	0.94
EU GDP F	-0.0064 [0.0101]	1.018 [0.0155]	0.48 -	1.00	0 [0.0279]	1.0246 [0.0384]	0.81 -	0.97
EU CPI	-0.0062 [0.0078]	1.034 [0.0181]	0.17 -	0.95	-0.009 [0.0129]	1.0051 [0.0349]	0.76 -	0.90
EU PPI	-0.0611* [0.0243]	1.1705* [0.0612]	0.02 (++)	0.92	0.0381 [0.0559]	0.7702 [0.1169]	0.15 -	0.32
EU Unempl. Rate	0.1276 [0.0998]	0.9847 [0.0116]	0.38 -	0.99	1.2825* [0.1924]	0.8607* [0.0226]	0.00 (+++)	0.93
EU Business Climate	0.0163 [0.0201]	1.0119 [0.0180]	0.48 -	0.98	0.0131 [0.0141]	0.9893 [0.0107]	0.36 -	0.99
ZEW EU Expectations	0.9275 [0.9915]	0.9508* [0.0235]	0.12 -	0.95	0.9275 [0.9507]	0.9508* [0.0240]	0.13 -	0.95
EU Ind. Prod.	-0.0695 [0.0504]	0.8662* [0.0372]	0.00 (+++)	0.75	-0.0248 [0.1037]	0.2055* [0.1096]	0.00 (+++)	0.04
EU Econ. Conf.	-0.373 [2.1647]	1.0045 [0.0214]	0.83 -	0.98	4.5741* [1.5956]	0.9589* [0.0164]	0.00 (+++)	0.97
EU Ind. Conf.	0.2008 [0.1598]	1.0237 [0.0138]	0.19 -	0.98	0.2758 [0.1765]	1.0238 [0.0133]	0.17 -	0.99
EU Cons. Conf.	-0.3622 [0.3469]	0.9812 [0.0270]	0.39 -	0.96	-0.548 [0.2781]	0.9702 [0.0176]	0.14 -	0.97
EU Retail Sales	-0.1082 [0.0611]	1.0378 [0.1294]	0.21 -	0.47	0.0877 [0.0676]	-0.3578* [0.1347]	0.00 (+++)	0.08
EU M3	-0.0629 [0.1043]	1.0175 [0.0141]	0.21 -	0.98	0.0256 [0.0794]	1.0121 [0.0105]	0.00 (+++)	0.99
EU M3 3mth avg	0.0117 [0.0350]	1.0017 [0.0047]	0.36 -	1.00	0.1764* [0.0876]	0.9897 [0.0115]	0.01 (++)	0.99

Source: Bloomberg, own calculation.

Note: \* indicates that the null hypothesis  $H_0: \alpha = 0$  OR  $H_0: \beta = 1$  have to be rejected at a 5% significance level. If the Wald test of the joint hypothesis  $H_0: \alpha = 0$  AND  $H_0: \beta = 1$  has to be rejected is visualized by (+), (++) and (+++) which corresponds to 10%, 5%, and 1% significance level. Brackets denote heteroskedasticity-robust standard errors.

**Table 13: Test of unbiasedness of median forecasts for German indicators (2002-2010)**

Dependent Variable Explanatory Variable	Actual Announcement				Latest Revision			
	Median Estimate				Median Estimate			
	$\alpha$	$\beta$	$p$	$R^2$	$\alpha$	$\beta$	$p$	$R^2$
<b>Indicators</b>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DE GDP QOQ A	-0.0119 [0.0538]	1.2203* [0.0591]	0.00 (+++)	0.92	0.0244 [0.1671]	0.8834 [0.1998]	0.84 -	0.42
DE GDP QOQ F	- -	- -	- -	-	- 0.0738	- 0.0660	0.42 -	0.90
DE CPI	-0.0109 [0.0133]	1.0363 [0.0366]	0.52 -	0.82	-0.0137 [0.0157]	1.0133 [0.0464]	0.68 -	0.79
DE PPI	0.0414 [0.0469]	1.2107 [0.1514]	0.03 (++)	0.58	0.0616 [0.0518]	0.9846 [0.1408]	0.44 -	0.36
DE Unempl. Rate	-0.0914 [0.0783]	1.0068 [0.0083]	0.03 (++)	0.99	-0.045 [0.0782]	1.0052 [0.0080]	0.73 -	0.99
DE Ind. Prod.	-0.3348 [0.1844]	1.2079 [0.2065]	0.18 -	0.39	-0.1676 [0.1986]	0.4828* [0.1908]	0.01 (+++)	0.08
IFO Bus. Climate	-1.4876 [1.8742]	1.0188 [0.0189]	0.03 (++)	0.97	-1.7787 [1.0986]	1.0197 [0.0111]	0.03 (++)	0.99
ZEW DE Expectation	0.4129 [1.0176]	0.9642 [0.0214]	0.19 -	0.95	0.4129 [0.9615]	0.9642 [0.0225]	0.26 -	0.95
ZEW DE Curr. Situation	1.4072 [0.8319]	1.0224* [0.0104]	0.09 (+)	0.99	1.4072 [0.7871]	1.0224 [0.0131]	0.09 (+)	0.99
DE Retail Sales	-0.8113* [0.1974]	1.34 [0.2650]	0.00 (+++)	0.30	0.3012 [0.1521]	-1.3984* [0.1867]	0.00 (+++)	0.42
DE Current Account	1.3132* [0.5858]	0.8959 [0.0797]	0.04 (++)	0.58	0.7470 [0.6839]	0.969 [0.0749]	0.25 -	0.63
DE Trade Balance	3.6724* [1.0538]	0.7362* [0.0894]	0.00 (+++)	0.42	1.0244 [0.8090]	0.9429 [0.0629]	0.12 -	0.68

Source: Bloomberg, own calculation.

Note: \* indicates that the null hypothesis  $H_0: \alpha = 0$  OR  $H_0: \beta = 1$  have to be rejected at a 5% significance level. If the Wald test of the joint hypothesis  $H_0: \alpha = 0$  AND  $H_0: \beta = 1$  has to be rejected is visualized by (+), (++) and (+++) which corresponds to 10%, 5%, and 1% significance level. Brackets denote heteroskedasticity-robust standard errors.

**Table 14: The impact of economic conditions when the announcement is released on standardized revisions vis-à-vis the latest revision for U.S. indicators**

<i>Indicators</i>	<i>constant</i>	<i>resUS<sub>t</sub></i>	<i>volUS<sub>t</sub></i>	<i>resEU<sub>t</sub></i>	<i>volEU<sub>t</sub></i>	<i>resDE<sub>t</sub></i>	<i>volDE<sub>t</sub></i>	<i>hOil<sub>t</sub></i>	<i>release_date<sub>t</sub></i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Building Permits	-11.2380**	0.2348	-0.0246	-2.4132	1.1443	0.3182	0.4526	1.3597	6.0000**
	[4.6143]	[1.1465]	[1.1835]	[1.5061]	[1.1839]	[0.8740]	[1.0798]	[1.1479]	[3.0000]
Business Inventories	-0.0121	0.0039	0.0048	-0.0119	0.0008	0.0130***	-0.0162***	-0.0064	7.0000
	[0.0292]	[0.0071]	[0.0073]	[0.0091]	[0.0071]	[0.0047]	[0.0056]	[0.0071]	[1.0000]
CPI	0.0077	-0.0007	0.0158***	-0.0012	-0.0019	-0.0011	-0.0032	0.0009	-4.0000
	[0.0220]	[0.0086]	[0.0054]	[0.0097]	[0.0051]	[0.0034]	[0.0040]	[0.0056]	[1.0000]
Chicago Purch. Mgrs.	-0.0867	-0.0096	-0.1328	-0.1006	0.0777	0.0782	-0.1833***	0.0648	7.0000
	[0.3230]	[0.0791]	[0.0813]	[0.0997]	[0.0792]	[0.0488]	[0.0599]	[0.0786]	[2.0000]
Cons. Conf.	0.3455	0.1085	0.0250	-0.2300	0.0611	0.0133	-0.2476***	0.0249	-2.0000
	[0.4774]	[0.1169]	[0.1201]	[0.1474]	[0.1171]	[0.0721]	[0.0885]	[0.1161]	[3.0000]
Consumer Credit	-1.2776**	-0.0344	0.1790	-0.1224	-0.1576	0.0857	-0.0369	0.1652	8.0000**
	[0.5844]	[0.1465]	[0.1739]	[0.1859]	[0.1591]	[0.0913]	[0.1138]	[0.1466]	[3.0000]
Durable Goods Orders	0.0101	0.0589	0.0775	-0.0360	-0.1335	0.0602	-0.0406	-0.0602	-1.0000
	[0.4037]	[0.0966]	[0.0990]	[0.1217]	[0.0966]	[0.0599]	[0.0730]	[0.1123]	[2.0000]
Factory Orders	0.1495	0.0323	0.0977*	-0.0234	-0.0075	-0.0321	0.0189	0.0639	-1.0000
	[0.2188]	[0.0632]	[0.0532]	[0.0741]	[0.0519]	[0.0330]	[0.0398]	[0.0515]	[1.0000]
GDP QoQ F	0.0242	-0.0004	0.0001	0.0034	-0.0001	-0.0033	0.0001	-0.0002	-1.0000
	[0.0252]	[0.0043]	[0.0049]	[0.0065]	[0.0049]	[0.0041]	[0.0050]	[0.0064]	[1.0000]

Continuing Table 14:

Gov't Budget Balance	0.3886	-0.4047	-1.3041	0.1366	0.4367	-0.3353	0.4205	1.1226	-2.0000
	[8.1744]	[2.0131]	[2.0724]	[2.5556]	[2.0208]	[1.2816]	[1.5500]	[2.0047]	[5.0000]
Housing Starts	-1.3146	-0.4820	0.4721	-1.5240	0.4460	0.2715	-0.0112	1.1727	6.0000
	[8.2433]	[2.0631]	[2.1237]	[2.6057]	[2.0708]	[1.2714]	[1.5652]	[2.0537]	[5.0000]
ISM Manufact. PMI	0.3643**	0.0465	-0.0552	-0.1145**	0.0836**	0.0134	-0.0789**	0.0326	-2.0000**
	[0.1621]	[0.0405]	[0.0417]	[0.0514]	[0.0407]	[0.0256]	[0.0312]	[0.0404]	[1.0000]
ISM Prices Paid	0.0561	0.0047	0.0025	-0.0249	0.0033	0.0306**	-0.0299*	-0.0062	-3.0000
	[0.0852]	[0.0213]	[0.0219]	[0.0269]	[0.0214]	[0.0131]	[0.0162]	[0.0212]	[5.0000]
Import Price Index	0.0178	0.0229	0.0950***	-0.0510	-0.0406	-0.0175	0.0091	0.0240	-1.0000
	[0.1034]	[0.0245]	[0.0256]	[0.0317]	[0.0248]	[0.0163]	[0.0199]	[0.0252]	[7.0000]
Ind. Production	0.0131	0.0165	0.0286*	-0.0215	-0.0072	-0.0127	0.0205	0.0221	-6.0000
	[0.0659]	[0.0163]	[0.0167]	[0.0206]	[0.0167]	[0.0102]	[0.0138]	[0.0189]	[4.0000]
Jobless Claims	0.6030	0.2030	0.1879	0.0361	0.1600	-0.1389	-0.0650	0.1142	-4.0000
	[0.6718]	[0.1738]	[0.1750]	[0.2148]	[0.1691]	[0.1027]	[0.1272]	[0.1650]	[4.0000]
Leading Indicators	-0.0902**	0.0137	-0.0001	-0.0097	0.0004	0.0062	-0.0003	-0.0096	5.0000*
	[0.0427]	[0.0106]	[0.0119]	[0.0134]	[0.0130]	[0.0066]	[0.0095]	[0.0124]	[2.0000]
New Home Sales	-1.6626	-1.3234	-0.0275	0.0507	1.1861	-0.1476	-0.3996	0.6082	1.0000
	[5.6078]	[1.3603]	[1.3977]	[1.7171]	[1.3627]	[0.8450]	[1.0300]	[1.3515]	[3.0000]
Nom. Current Account	-1.3880	1.2048***	0.7571**	-0.8081	-0.7399*	0.1377	-0.2780	-0.7650	6.0000
	[1.7301]	[0.3114]	[0.3629]	[0.4783]	[0.3629]	[0.2975]	[0.3665]	[0.4740]	[1.0000]
Non-farm Payroll	-9.3239	3.9427	4.6876*	-6.5657**	0.9274	3.2436**	-3.2191*	1.7416	6.0000
	[10.0134]	[2.4374]	[2.5505]	[3.1599]	[2.4498]	[1.5981]	[1.9065]	[2.5210]	[6.0000]

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**Continuing Table 14:**

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PPI	-0.0356	0.0269	-0.0070	-0.0372	-0.0105	0.0014	0.0049	0.0063	2.0000
	[0.0881]	[0.0245]	[0.0223]	[0.0315]	[0.0223]	[0.0139]	[0.0187]	[0.0232]	[5.0000]
Phil. Fed Index	-0.0438	0.0208	-0.1745	-0.1762	0.2777*	0.1324	-0.4168***	-0.0118	4.0000
	[0.6468]	[0.1616]	[0.1663]	[0.2049]	[0.1622]	[0.1023]	[0.1244]	[0.1609]	[4.0000]
Retail Sales	-0.0017	0.0188	-0.0106	-0.0366	0.0405	0.0252	-0.0456**	-0.0079	-4.0000
	[0.1114]	[0.0333]	[0.0288]	[0.0404]	[0.0277]	[0.0176]	[0.0212]	[0.0303]	[7.0000]
Retail Sales ex Autos	0.0261	0.0256	0.0277	-0.0437	0.0165	0.0045	-0.0321*	0.0169	-1.0000
	[0.0792]	[0.0193]	[0.0205]	[0.0263]	[0.0201]	[0.0131]	[0.0172]	[0.0199]	[5.0000]
US Trade Balance	0.0712	-0.0059	0.2649***	0.1029	-0.1282**	-0.0267	-0.0217	-0.0025	-6.0000
	[0.2508]	[0.0629]	[0.0647]	[0.0794]	[0.0631]	[0.0388]	[0.0477]	[0.0626]	[1.0000]

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Source: Bloomberg, own calculation.

Note: OLS standard errors are displayed in brackets. Coefficients significantly different from 0 at 1%, 5%, and 10% significance level are distinguished with \*\*\*, \*\*, and \*. Since the indicators "Federal Funds Rate" and "University of Michigan Confidence" are never revised, they are left out.

**Table 15: The impact of economic conditions when the announcement is released on standardized surprises with respect to the initial announcement for US indicators (2002-2010)**

<i>Indicators</i>	<i>constant</i>	<i>resUS<sub>t</sub></i>	<i>volUS<sub>t</sub></i>	<i>resEU<sub>t</sub></i>	<i>volEU<sub>t</sub></i>	<i>resDE<sub>t</sub></i>	<i>volDE<sub>t</sub></i>	<i>hOil<sub>t</sub></i>	<i>release_date<sub>t</sub></i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Building Permits	11.0115*	-0.0810	0.1848	-2.5715	0.8836	0.9138	-0.4272	4.2815***	-7.0000*
	[5.7404]	[1.4263]	[1.4723]	[1.8736]	[1.4729]	[1.0873]	[1.3433]	[1.4281]	[3.0000]
Business Inventories	0.9698	-0.6261	-1.9197**	0.1901	1.7943*	0.8846	-0.6108	-0.7106	-6.0000
	[3.7551]	[0.9135]	[0.9402]	[1.1652]	[0.9168]	[0.5991]	[0.7155]	[0.9098]	[2.0000]
CPI	2.0479	1.9660	1.7344**	-2.8338*	-0.2283	-0.1883	-0.3708	2.6425***	-1.0000
	[3.5403]	[1.3864]	[0.8618]	[1.5624]	[0.8276]	[0.5496]	[0.6443]	[0.9053]	[2.0000]
Chicago Purch. Mgrs.	-0.8309	-0.8252	-2.9431	-0.2524	1.6729	0.8207	-2.5263*	2.3331	1.0000
	[7.4699]	[1.8292]	[1.8793]	[2.3067]	[1.8324]	[1.1289]	[1.3850]	[1.8173]	[5.0000]
Cons. Conf.	8.5757	2.0604	-0.0935	-2.7094	2.0455	-0.8816	-3.0624**	1.5017	-5.0000
	[7.3843]	[1.8083]	[1.8578]	[2.2803]	[1.8114]	[1.1159]	[1.3691]	[1.7965]	[5.0000]
Consumer Credit	-3.5754	-2.4897	2.1071	0.2699	-3.0367	2.1865*	-2.6401*	2.6294	2.0000
	[7.4777]	[1.8745]	[2.2247]	[2.3792]	[2.0359]	[1.1682]	[1.4558]	[1.8760]	[5.0000]
Durable Goods Orders	0.7501	1.4642	2.5427*	-1.7458	-1.6791	0.3591	-0.7458	0.9767	-7.0000
	[5.9280]	[1.4187]	[1.4544]	[1.7868]	[1.4180]	[0.8797]	[1.0718]	[1.6487]	[4.0000]
Factory Orders	2.3208	-0.3218	-0.8373	0.9908	-0.1840	-0.5363	0.3545	1.5406*	-1.0000
	[3.7041]	[1.0692]	[0.9007]	[1.2545]	[0.8782]	[0.5594]	[0.6736]	[0.8712]	[2.0000]
Federal Funds Rate	16.4590**	1.1394*	0.2163	1.1831*	0.0133	-1.4741***	0.3792	0.1406	-1.0000**
	[6.1079]	[0.6136]	[0.4149]	[0.6225]	[0.4452]	[0.4463]	[0.4530]	[0.6705]	[4.0000]
GDP QoQ F	9.8651	1.5724	3.6578	-2.3229	-3.4897	0.5191	-0.3837	1.0281	-7.0000
	[11.5770]	[1.9641]	[2.2638]	[2.9965]	[2.2642]	[1.8748]	[2.2862]	[2.9570]	[7.0000]

**Continuing Table 15:**

Gov't Budget Balance	-0.1541	-0.5452	0.3635	0.1147	-0.6115	0.1812	0.1508	0.4989	1.0000
	[1.6524]	[0.4067]	[0.4187]	[0.5186]	[0.4083]	[0.2658]	[0.3186]	[0.4052]	[1.0000]
Housing Starts	9.6447	0.0280	0.5528	-0.2822	-1.3078	-0.4863	0.9758	2.6845	-6.0000
	[6.7142]	[1.6804]	[1.7298]	[2.1223]	[1.6867]	[1.0356]	[1.2749]	[1.6728]	[4.0000]
ISM Manufact. PMI	-3.1570	-0.0057	-1.8906	-1.5661	2.2797*	0.5441	-1.9943**	1.8471	2.0000
	[5.2022]	[1.3020]	[1.3402]	[1.6444]	[1.3069]	[0.8024]	[0.9878]	[1.2961]	[3.0000]
ISM Prices Paid	-5.6626	1.8227	-1.9344	-3.8170**	-1.1738	2.0839**	-1.5048	1.0225	4.0000
	[5.9034]	[1.4775]	[1.5209]	[1.8660]	[1.4830]	[0.9105]	[1.1209]	[1.4707]	[4.0000]
Import Price Index	-0.1301	0.7734	1.4855*	-1.2660	-1.4724*	-0.6335	1.0435	1.6282*	2.0000
	[3.5408]	[0.8372]	[0.8746]	[1.0856]	[0.8491]	[0.5571]	[0.6812]	[0.8642]	[2.0000]
Ind. Production	-1.8236	0.2097	-0.1777	-0.4433	-2.0117*	-0.0970	0.8277	-0.0175	1.0000
	[4.2001]	[1.0368]	[1.0667]	[1.3106]	[1.0668]	[0.6535]	[0.8801]	[1.2078]	[2.0000]
Jobless Claims	-1.9801	0.2142	0.2514	-0.9976	0.9819	0.5483	-0.2942	0.1947	1.0000
	[2.8007]	[0.7246]	[0.7294]	[0.8956]	[0.7051]	[0.4281]	[0.5304]	[0.6878]	[1.0000]
Leading Indicators	-3.3478	0.1770	1.3995**	-0.7914	-1.8514**	0.4890	0.2484	-0.6242	2.0000
	[2.4647]	[0.6118]	[0.6868]	[0.7753]	[0.7537]	[0.3822]	[0.5516]	[0.7149]	[1.0000]
New Home Sales	7.5335	-2.6665	0.8175	1.7690	-0.7351	0.1363	-0.2333	-0.0355	-4.0000
	[7.7734]	[1.8857]	[1.9374]	[2.3802]	[1.8889]	[1.1714]	[1.4277]	[1.8734]	[5.0000]
Nom. Current Account	-3.4075	-1.0576	-0.8683	1.9559	-2.1739	0.6708	0.2741	-2.7565	2.0000
	[6.8189]	[1.2274]	[1.4302]	[1.8853]	[1.4305]	[1.1725]	[1.4444]	[1.8682]	[4.0000]

Continuing Table 15:

Non-farm Payroll	-5.3351	2.5249*	1.9446	-4.6835**	-0.0111	0.4231	-1.7567	2.6828*	3.0000
	[5.9114]	[1.4389]	[1.5057]	[1.8655]	[1.4462]	[0.9435]	[1.1255]	[1.4883]	[4.0000]
PPI	3.3812	1.0098	-0.6178	-0.2300	-2.2773	-0.4152	0.9944	0.4440	-2.0000
	[6.4597]	[1.7963]	[1.6382]	[2.3125]	[1.6378]	[1.0170]	[1.3732]	[1.6976]	[4.0000]
Phil. Fed Index	2.3532	-0.7384	-0.6666	0.5142	1.4693	0.1733	-2.7167**	-0.8468	-1.0000
	[6.7843]	[1.6949]	[1.7447]	[2.1497]	[1.7014]	[1.0728]	[1.3049]	[1.6878]	[4.0000]
Retail Sales	-0.8226	1.1523	1.2193	-3.5313*	0.7778	0.3248	-1.1199	1.9968	7.0000
	[5.2613]	[1.5710]	[1.3620]	[1.9060]	[1.3083]	[0.8327]	[1.0008]	[1.4306]	[3.0000]
Retail Sales ex Autos	3.2558	1.2970	1.1767	-2.3873	0.2084	-0.2546	-0.9897	1.5894	-2.0000
	[5.6249]	[1.3717]	[1.4522]	[1.8644]	[1.4269]	[0.9327]	[1.2233]	[1.4124]	[3.0000]
U. of Michigan Conf.	-2.4748	1.0677	-0.9602	-0.2322	0.0359	0.4776	-0.8565	-0.7774	1.0000
	[4.3142]	[0.9896]	[1.1005]	[1.3196]	[1.0661]	[0.6695]	[0.8110]	[1.0705]	[2.0000]
US Trade Balance	1.3834	0.0147	2.6606	0.7832	-1.6971	-1.1613	0.1802	1.0717	-8.0000
	[6.3827]	[1.6002]	[1.6472]	[2.0211]	[1.6062]	[0.9861]	[1.2140]	[1.5929]	[4.0000]

Source: Bloomberg, own calculation.

Note: OLS standard errors are displayed in brackets. Coefficients significantly different from 0 at 1%, 5%, and 10% significance level are distinguished with \*\*\*, \*\*, and \*.

**Table 16: The impact of economic conditions when the announcement is released on standardized surprises with respect to the latest revision for US indicators (2002-2010)**

<i>Indicators</i>	<i>constant</i> (1)	<i>resUS<sub>t</sub></i> (2)	<i>volUS<sub>t</sub></i> (3)	<i>resEU<sub>t</sub></i> (4)	<i>volEU<sub>t</sub></i> (5)	<i>resDE<sub>t</sub></i> (6)	<i>volDE<sub>t</sub></i> (7)	<i>hOil<sub>t</sub></i> (8)	<i>release_date<sub>t</sub></i> (9)
Building Permits	17.8746*** [3.0320]	-0.1475 [0.7533]	0.0611 [0.7777]	1.2530 [0.9896]	-0.7360 [0.7779]	0.6256 [0.5743]	-0.8321 [0.7095]	0.4512 [0.7543]	-1.0000*** [2.0000]
Business Inventories	4.7434 [5.0289]	-0.0432 [1.2234]	-2.4753* [1.2592]	1.0520 [1.5604]	1.0994 [1.2278]	-1.9508** [0.8024]	2.6487*** [0.9581]	1.1862 [1.2184]	-2.0000 [3.0000]
CPI	-1.2254 [5.6698]	2.2162 [2.2203]	-1.0986 [1.3802]	-3.1558 [2.5023]	0.3090 [1.3255]	0.3713 [0.8802]	-0.1554 [1.0318]	2.7827* [1.4498]	6.0000 [3.0000]
Chicago Purch. Mgrs.	-0.2397 [4.0398]	-0.6817 [0.9893]	-0.2143 [1.0164]	2.1625* [1.2475]	-0.3174 [0.9910]	-1.1990* [0.6105]	1.8624** [0.7490]	-0.3179 [0.9828]	4.0000 [2.0000]
Cons. Conf.	-1.6212 [4.0539]	-0.5338 [0.9927]	-0.5415 [1.0199]	1.0291 [1.2518]	0.7556 [0.9944]	-0.2170 [0.6126]	1.2792* [0.7516]	1.4553 [0.9862]	1.0000 [2.0000]
Consumer Credit	16.8921*** [5.6411]	-2.1934 [1.4141]	-1.0141 [1.6783]	2.4568 [1.7948]	0.2044 [1.5359]	0.5068 [0.8813]	-1.3230 [1.0983]	-0.3397 [1.4152]	-1.0000*** [3.0000]
Durable Goods Orders	-4.6497 [9.7143]	-0.6009 [2.3248]	-0.7382 [2.3834]	-0.8022 [2.9280]	1.8598 [2.3237]	-0.8778 [1.4416]	1.6440 [1.7563]	2.5137 [2.7018]	3.0000 [6.0000]
Factory Orders	-9.5282 [13.3134]	-1.8426 [3.8431]	-4.9973 [3.2374]	2.3067 [4.5089]	0.9544 [3.1564]	0.7937 [2.0105]	-0.8369 [2.4211]	-2.4281 [3.1313]	6.0000 [9.0000]
Federal Funds Rate	16.4590** [6.1079]	1.1394* [0.6136]	0.2163 [0.4149]	1.1831* [0.6225]	0.0133 [0.4452]	-1.4741*** [0.4463]	0.3792 [0.4530]	0.1406 [0.6705]	-1.0000** [4.0000]
GDP QoQ F	0.4264 [14.4695]	1.7198 [2.4548]	3.6163 [2.8294]	-3.6376 [3.7452]	-3.4350 [2.8300]	1.8182 [2.3432]	-0.4364 [2.8574]	1.0918 [3.6958]	-9.0000 [9.0000]

Continuing Table 16:

Gov't Budget Balance	-41.5242	3.1810	8.7746	-11.9474	-5.9734	6.1045	-7.1402	-3.6923	2.0000
	[43.6190]	[10.7361]	[11.0532]	[13.6897]	[10.7784]	[7.0169]	[8.4107]	[10.6959]	[2.0000]
Housing Starts	9.4030**	0.9500	-0.1085	1.2578	-1.0079	-0.7313	0.4358	0.4833	-6.0000**
	[3.5645]	[0.8921]	[0.9183]	[1.1267]	[0.8955]	[0.5498]	[0.6768]	[0.8881]	[2.0000]
ISM Manufact. PMI	-13.0702***	-1.1260	0.4621	2.2269**	-0.9110	-0.0762	0.3768	0.6018	8.0000***
	[2.9564]	[0.7399]	[0.7617]	[0.9345]	[0.7427]	[0.4560]	[0.5614]	[0.7366]	[2.0000]
ISM Prices Paid	-6.9373	1.7214	-1.9940	-3.2275*	-1.2536	1.3600	-0.7929	1.1703	4.0000
	[5.8384]	[1.4612]	[1.5041]	[1.8455]	[1.4667]	[0.9005]	[1.1086]	[1.4546]	[3.0000]
Import Price Index	1.1554	-0.3746	-2.0700	1.6860	-0.8542	0.6621	-0.2136	0.3552	-8.0000
	[7.3891]	[1.7472]	[1.8251]	[2.2655]	[1.7719]	[1.1626]	[1.4216]	[1.8034]	[5.0000]
Ind. Production	-4.8961	-2.4614	-3.2409*	2.4783	0.7185	1.8474*	-2.1160	-3.4213*	2.0000
	[6.9942]	[1.7266]	[1.7763]	[2.1824]	[1.7765]	[1.0882]	[1.4656]	[2.0113]	[4.0000]
Jobless Claims	-2.9809*	-0.4797	-0.4770	-0.9927*	0.5208	1.0288***	-0.1347	-0.2731	2.0000**
	[1.6571]	[0.4287]	[0.4316]	[0.5299]	[0.4172]	[0.2533]	[0.3138]	[0.4070]	[1.0000]
Leading Indicators	29.7447***	-1.1536	2.2421	0.8263	-2.8909	-1.5690	0.9461	0.4245	-1.0000***
	[9.3972]	[2.3326]	[2.6184]	[2.9560]	[2.8737]	[1.4572]	[2.1029]	[2.7257]	[6.0000]
New Home Sales	13.3872***	0.4784	0.6924	1.6033	-2.0935*	0.2672	-0.3362	-1.1454	-9.0000***
	[4.5469]	[1.1030]	[1.1332]	[1.3923]	[1.1049]	[0.6852]	[0.8351]	[1.0958]	[3.0000]
Nom. Current Account	10.8629	-9.6504***	-4.3314	7.8732*	1.6533	-0.4947	4.6217	1.8851	-4.0000
	[14.7938]	[2.6629]	[3.1029]	[4.0902]	[3.1034]	[2.5438]	[3.1336]	[4.0530]	[1.0000]

**Continuing Table 16:**

Non-farm Payroll	6.4981	-0.5894	-1.5925	1.2974	-2.6359	-2.4414*	0.3428	-1.2225	-4.0000
	[8.2057]	[1.9974]	[2.0901]	[2.5895]	[2.0075]	[1.3096]	[1.5623]	[2.0659]	[5.0000]
PPI	6.4029	-0.5194	0.1134	2.6909	-1.8338	-0.7478	0.2737	-0.2249	-4.0000
	[8.4855]	[2.3596]	[2.1519]	[3.0378]	[2.1514]	[1.3359]	[1.8039]	[2.2300]	[5.0000]
Phil. Fed Index	3.4838	-0.0318	2.0884**	0.5520	-3.1001***	-0.9079	1.3680*	0.0202	-2.0000
	[3.9697]	[0.9917]	[1.0209]	[1.2578]	[0.9955]	[0.6277]	[0.7635]	[0.9876]	[2.0000]
Retail Sales	-4.1359	-1.4066	2.1471	0.0631	-1.5753	-0.9038	1.0676	2.2608	3.0000
	[10.9392]	[3.2665]	[2.8319]	[3.9629]	[2.7202]	[1.7314]	[2.0808]	[2.9745]	[7.0000]
Retail Sales ex Autos	-2.3593	-2.0086	-2.4146	3.0285	0.0630	-0.1551	1.4070	-1.0479	1.0000
	[8.6508]	[2.1096]	[2.2334]	[2.8674]	[2.1945]	[1.4345]	[1.8814]	[2.1722]	[5.0000]
U. of Michigan Conf.	-2.4748	1.0677	-0.9602	-0.2322	0.0359	0.4776	-0.8565	-0.7774	1.0000
	[4.3142]	[0.9896]	[1.1005]	[1.3196]	[1.0661]	[0.6695]	[0.8110]	[1.0705]	[2.0000]
US Trade Balance	-0.8647	0.0623	-1.4297	-0.8795	-1.0555	-0.2971	1.1599	-0.0642	1.0000
	[3.9582]	[0.9924]	[1.0215]	[1.2534]	[0.9961]	[0.6116]	[0.7529]	[0.9878]	[2.0000]

Source: Bloomberg, own calculation.

Note: OLS standard errors are displayed in brackets. Coefficients significantly different from 0 at 1%, 5%, and 10% significance level are distinguished with \*\*\*, \*\*, and \*.

**Table 17: The impact of US economic conditions, both during the reporting period and when the announcement is released, on uncertainty about US indicators**

	<i>constant</i>	<i>resUS<sub>t</sub></i>	<i>volUS<sub>t</sub></i>	<i>resUS<sub>rp</sub></i>	<i>volUS<sub>rp</sub></i>	<i>hOil<sub>t</sub></i>	<i>hOil<sub>rp</sub></i>	<i>NumEstimates<sub>t</sub></i>
<i>Indicators</i>	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Building Permits	55.9023*** [3.3173]	4.7124 [6.6570]	-2.6836 [4.6688]	-4.2328 [6.7175]	-2.6468 [4.6672]	3.6367 [7.0195]	-2.3326 [7.0181]	-0.7217*** [0.0904]
Business Inventories	0.1610** [0.0718]	-0.0221 [0.0270]	0.0211 [0.0267]	0.1115*** [0.0255]	-0.0056 [0.0272]	-0.052 [0.0337]	-0.0463 [0.0320]	-0.0003 [0.0014]
CPI	0.0355 [0.0329]	-0.0135 [0.0231]	0.003 [0.0165]	0.0542** [0.0228]	0.0472*** [0.0168]	-0.0239 [0.0245]	0.0006 [0.0245]	0.0008 [0.0005]
Consumer Credit	3.8118*** [0.6502]	-0.2354 [0.3691]	0.0432 [0.4080]	0.1941 [0.3549]	0.121 [0.3920]	-0.7233 [0.4605]	-0.1618 [0.4434]	-0.0429** [0.0176]
Durable Goods Orders	1.1832*** [0.3348]	0.1979 [0.2454]	0.1162 [0.1723]	-0.1679 [0.2470]	0.0963 [0.1741]	-0.0873 [0.2705]	-0.0311 [0.2699]	-0.0021 [0.0050]
Factory Orders	0.6402*** [0.2099]	-0.1326 [0.1201]	0.2768*** [0.1010]	0.3178*** [0.1056]	0.1351 [0.1038]	-0.1697 [0.1296]	-0.1197 [0.1227]	-0.0024 [0.0034]
GDP QoQ A	-	-	-	-	-	-	-	-
GDP QoQ F	-0.0535 [0.0547]	-0.0092 [0.0242]	0.0617** [0.0250]	0.0263 [0.0247]	-0.0033 [0.0249]	-0.0244 [0.0362]	-0.0475 [0.0362]	0.0023*** [0.0008]
GDP QoQ S	0.1473	-0.04	0.1672*	-0.0214	0.0895	-0.0117	0.0278	0.0011

**Continuing Table 17:**

	[0.1490]	[0.1021]	[0.0865]	[0.0804]	[0.0701]	[0.1024]	[0.1113]	[0.0021]
Gov't Budget Balance	19.1193***	3.6701	4.5401	1.7476	4.0977	8.9608	-6.8946	-0.3218
	[6.7981]	[5.8866]	[4.1370]	[5.8911]	[4.1378]	[6.2162]	[6.2162]	[0.2057]
Housing Starts	91.1308***	1.6111	-3.3928	-5.1524	-1.9944	3.2879	-0.1464	-0.8734***
	[9.2093]	[7.4418]	[5.2193]	[7.4726]	[5.2218]	[7.8468]	[7.8521]	[0.1414]
ISM Manufact. PMI	1.3112***	-0.2266	-0.0652	0.3355**	0.3210***	-0.0457	-0.2702*	-0.0047**
	[0.1563]	[0.1476]	[0.1046]	[0.1478]	[0.1036]	[0.1558]	[0.1559]	[0.0023]
ISM Prices Paid	1.4857	0.3562	0.5148	-0.2725	0.2139	-1.0911	0.9088	0.0714
	[0.9486]	[1.1402]	[0.7842]	[1.1137]	[0.7962]	[1.1760]	[1.1746]	[0.0512]
Import Price Index	0.1721*	0.0599	0.0524	0.2341*	0.2287**	-0.1829	0.0131	0.0046*
	[0.0992]	[0.1316]	[0.0923]	[0.1309]	[0.0924]	[0.1378]	[0.1377]	[0.0023]
Ind. Production	0.1208	-0.0163	0.1294***	0.1063**	0.0891**	-0.084	-0.0004	0.0009
	[0.0747]	[0.0530]	[0.0370]	[0.0527]	[0.0372]	[0.0581]	[0.0582]	[0.0011]
Jobless Claims	9.7603***	3.3285	4.7391	-0.4005	0.113	-2.92	1.1094	-0.0467
	[2.2327]	[6.6758]	[3.0763]	[6.6029]	[3.0522]	[4.7466]	[4.7468]	[0.0582]
Leading Indicators	0.0864	-0.0092	0.0403	0.0739	-0.0359	-0.0193	-0.0256	0.001
	[0.0804]	[0.0546]	[0.0396]	[0.0545]	[0.0398]	[0.0599]	[0.0601]	[0.0015]
New Home Sales	51.1439***	-2.6348	0.1586	-7.6325	-1.3015	-0.7814	1.5093	-0.4076***
	[6.9421]	[6.9447]	[4.8571]	[6.9150]	[4.8590]	[7.2973]	[7.2973]	[0.1112]
Nom. Current Account	-0.8435	0.3231	2.4982**	1.5637	1.6034	-0.9986	-1.7312	0.0946*
	[2.3164]	[1.1223]	[1.1405]	[1.1349]	[1.1612]	[1.7032]	[1.6869]	[0.0529]
Non-farm Payroll	46.3883***	-10.9209	1.5089	17.7912*	3.8521	-3.6723	-15.226	-0.1592

Continuing Table 17:

	[11.2565]	[9.6747]	[6.8515]	[9.6579]	[6.8322]	[10.2038]	[10.1982]	[0.1516]
PPI	0.0566	0.1196*	-0.0445	0.0344	0.0666	-0.0247	-0.0834	0.0022**
	[0.0685]	[0.0586]	[0.0449]	[0.0584]	[0.0467]	[0.0627]	[0.0627]	[0.0010]
Retail Sales	0.5095***	-0.0337	0.1089*	0.0608	0.2038***	-0.0088	0.0112	-0.0033*
	[0.1250]	[0.0871]	[0.0618]	[0.0860]	[0.0626]	[0.1293]	[0.1268]	[0.0018]
Retail Sales ex Autos	0.1375*	0.0095	0.0396	0.0825*	0.1803***	-0.0383	-0.0231	0.001
	[0.0774]	[0.0459]	[0.0367]	[0.0455]	[0.0369]	[0.0487]	[0.0489]	[0.0011]
US Trade Balance	0.0492	-0.0324	0.5054***	0.1384	0.6947***	-0.0977	0.068	0.0163***
	[0.2995]	[0.1637]	[0.1539]	[0.1480]	[0.1592]	[0.1963]	[0.1865]	[0.0045]

Source: Bloomberg, own calculation.

Note: Coefficients significantly different from 0 at 1%, 5%, and 10% significance level are distinguished with \*\*\*, \*\*, and \*. Brackets denote OLS standard errors. Indicators for which the reporting period coincides with the release period are not considered in this specification due to collinearity.

**Table 18: The Effect of economic conditions on uncertainty about initial announcements**

<i>Indicator</i>	<i>constant</i>	<i>resUS<sub>rp</sub></i>	<i>volUS<sub>rp</sub></i>	<i>resEU<sub>rp</sub></i>	<i>volEU<sub>rp</sub></i>	<i>resDE<sub>rp</sub></i>	<i>volDE<sub>rp</sub></i>	<i>hOil<sub>rp</sub></i>	<i>NumEstimates<sub>t</sub></i>
Building Permits	60.3153*** [3.5532]	-1.5422 [5.2658]	-0.7368 [5.4154]	8.1799 [6.8627]	0.3424 [5.3393]	-8.5591** [3.8392]	-0.5406 [4.7445]	3.0848 [5.2570]	-0.8136*** [0.0932]
Business Inventories	0.2121*** [0.0759]	0.0805*** [0.0280]	0.0141 [0.0338]	0.0228 [0.0361]	-0.0309 [0.0325]	-0.0100 [0.0183]	-0.0001 [0.0252]	-0.0795** [0.0323]	-0.0012 [0.0014]
CPI	0.0860* [0.0496]	0.0736** [0.0302]	0.0461** [0.0191]	-0.0127 [0.0360]	-0.0064 [0.0181]	-0.0243* [0.0141]	0.0221 [0.0142]	-0.0117 [0.0196]	0.0001 [0.0007]
Chicago Purch. Mgrs.	2.1516*** [0.3881]	0.1394 [0.2037]	0.1180 [0.2119]	0.5378** [0.2635]	-0.1872 [0.2080]	-0.4502*** [0.1249]	0.2050 [0.1568]	-0.7824*** [0.2119]	-0.0110 [0.0070]
Cons. Conf.	1.9017*** [0.5720]	-0.0372 [0.3251]	-0.6323* [0.3453]	0.1605 [0.4097]	0.7440** [0.3329]	0.4810** [0.1928]	-0.4458* [0.2520]	-0.8257** [0.3388]	-0.0022 [0.0088]
Consumer Credit	3.7945*** [0.6582]	0.2364 [0.3821]	0.0337 [0.5203]	-0.3557 [0.4846]	0.6052 [0.5409]	-0.2554 [0.2165]	0.0698 [0.3371]	-0.2788 [0.4447]	-0.0415** [0.0181]
Durable Goods Orders	1.9338*** [0.4739]	-0.0171 [0.1932]	0.0427 [0.2025]	0.3487 [0.2572]	0.0156 [0.1967]	-0.3318** [0.1316]	0.2537* [0.1477]	-0.0305 [0.2301]	-0.0125* [0.0068]
Factory Orders	0.8931*** [0.2781]	0.3365*** [0.1103]	0.1149 [0.1310]	-0.0688 [0.1489]	0.1490 [0.1277]	-0.1171 [0.0807]	0.0802 [0.0999]	-0.1418 [0.1268]	-0.0063 [0.0044]
Federal Funds Rate	-0.0839*** [0.0209]	0.0221 [0.0259]	-0.0560** [0.0237]	0.0876*** [0.0319]	-0.0118 [0.0254]	0.0431*** [0.0132]	0.0287 [0.0224]	-0.1232*** [0.0259]	0.0010*** [0.0002]
GDP QoQ A	0.2826 [0.3265]	0.1172 [0.0917]	0.1082 [0.1126]	0.0807 [0.1505]	-0.1807 [0.1111]	0.1391 [0.0905]	-0.0241 [0.1084]	-0.2221 [0.1507]	0.0018 [0.0042]
GDP QoQ F	-0.0208 [0.0825]	0.0134 [0.0262]	0.0075 [0.0306]	0.0110 [0.0383]	-0.0355 [0.0313]	0.0110 [0.0245]	-0.0233 [0.0297]	-0.0643 [0.0405]	0.0018 [0.0012]
GDP QoQ S	0.1265 [0.2536]	-0.0377 [0.0610]	0.0449 [0.0734]	0.0677 [0.1022]	-0.0826 [0.0769]	0.0279 [0.0648]	0.0406 [0.0707]	-0.0982 [0.0948]	0.0013 [0.0035]
Gov't Budget Balance	21.0068*** [6.6779]	-2.2898 [4.5892]	0.6466 [4.8159]	17.2650*** [5.7529]	1.1315 [4.6552]	-6.6268*** [2.4040]	5.1356 [3.5501]	-3.6587 [4.6098]	-0.3483* [0.2033]
Housing Starts	116.2333*** [11.1046]	-4.8361 [5.7400]	-1.7165 [5.9129]	10.5363 [7.2029]	0.7495 [5.7814]	-12.0194*** [3.4478]	2.7561 [4.3212]	6.4068 [5.7913]	-1.2262*** [0.1651]
ISM Manufact. PMI	1.4499*** [0.2081]	0.1382 [0.1197]	0.3063** [0.1251]	0.0452 [0.1525]	-0.0417 [0.1223]	-0.1134 [0.0753]	0.0985 [0.0924]	-0.2648** [0.1244]	-0.0065** [0.0029]

Continuing Table 18:

ISM Prices Paid	1.5948*	-1.0560	0.2900	1.6632	-0.0646	-0.2167	-0.1392	-0.3501	0.0692
	[0.9586]	[0.9094]	[0.9505]	[1.1282]	[0.9135]	[0.4613]	[0.6823]	[0.9119]	[0.0511]
Import Price Index	0.1899	0.1998*	0.1795	0.1706	0.0337	-0.0616	0.0987	-0.1480	0.0043
	[0.1273]	[0.1067]	[0.1114]	[0.1389]	[0.1073]	[0.0694]	[0.0834]	[0.1107]	[0.0028]
Ind. Production	0.2132**	0.0800*	0.0934**	0.0716	0.0714	-0.0444*	-0.0076	-0.0805	-0.0003
	[0.0928]	[0.0449]	[0.0468]	[0.0568]	[0.0469]	[0.0265]	[0.0382]	[0.0530]	[0.0013]
Jobless Claims	8.5294***	1.8831	5.6130***	0.7302	-2.6986	1.5818	-1.4604	-2.8415	-0.0181
	[2.7438]	[1.7988]	[1.9714]	[2.3345]	[1.9398]	[1.0853]	[1.4387]	[1.8970]	[0.0689]
Leading Indicators	0.1059	0.0486	-0.0617	0.0271	0.0621	-0.0020	-0.0281	-0.0476	0.0007
	[0.1007]	[0.0445]	[0.0582]	[0.0558]	[0.0582]	[0.0276]	[0.0359]	[0.0535]	[0.0018]
New Home Sales	69.9947***	-13.3113**	-0.2466	12.5138*	-0.2742	-10.4740***	1.1230	2.9949	-0.6780***
	[8.2390]	[5.2420]	[5.4720]	[6.8008]	[5.3644]	[3.0914]	[3.9869]	[5.3425]	[0.1268]
Nom. Current Account	2.7487	0.7214	1.9380	2.6019	-1.8418	-1.1750	0.2954	-2.3339	0.0207
	[2.7824]	[1.2121]	[1.3738]	[1.7596]	[1.3328]	[0.9336]	[1.2800]	[1.7367]	[0.0618]
Non-farm Payroll	46.6647***	3.3392	8.8183	7.9016	-13.5494*	1.4708	-0.3837	-23.8795***	-0.1642
	[16.1571]	[7.6742]	[8.1841]	[10.2391]	[7.9553]	[5.4728]	[6.2769]	[8.2072]	[0.2095]
PPI	0.0842	0.0937*	0.0887	0.0653	-0.0270	-0.0268	-0.0010	-0.0849	0.0019*
	[0.0772]	[0.0476]	[0.0719]	[0.0666]	[0.0627]	[0.0306]	[0.0390]	[0.0564]	[0.0011]
Phil. Fed Index	2.0049*	0.0003	0.1153	-0.3548	-0.0148	0.7787**	0.1372	0.2134	0.0183
	[1.0762]	[0.5197]	[0.5422]	[0.6878]	[0.5318]	[0.3602]	[0.4062]	[0.5372]	[0.0201]
Retail Sales	0.5568***	0.0651	0.1487**	0.0770	-0.0013	-0.0546	0.1399**	-0.0503	-0.0039*
	[0.1689]	[0.0815]	[0.0738]	[0.1088]	[0.0687]	[0.0476]	[0.0532]	[0.0733]	[0.0023]
Retail Sales ex Autos	0.1439	0.0746**	0.2709***	0.0413	-0.1228*	-0.0201	0.0521*	-0.0580	0.0009
	[0.0914]	[0.0363]	[0.0667]	[0.0476]	[0.0721]	[0.0226]	[0.0305]	[0.0385]	[0.0013]
U. of Michigan Conf.	-0.1280	0.1110	-0.0777	0.1841	0.1315	0.1582	0.0741	-0.3631*	0.0217***
	[0.2891]	[0.1847]	[0.1928]	[0.2377]	[0.1889]	[0.1130]	[0.1424]	[0.1880]	[0.0050]
US Trade Balance	-0.0276	0.1248	0.5644***	0.1657	0.0737	-0.0123	0.2480*	-0.0521	0.0173***
	[0.4502]	[0.1651]	[0.1993]	[0.2297]	[0.1934]	[0.1273]	[0.1439]	[0.1920]	[0.0065]
ECB Interest Rates	0.0106	0.0064	-0.0066	0.0084	-0.0727***	0.0512***	0.0434**	-0.0688***	0.0000
	[0.0172]	[0.0232]	[0.0236]	[0.0291]	[0.0233]	[0.0141]	[0.0185]	[0.0230]	[0.0004]
EU GDP A	-0.0482	-0.0016	0.0913	0.0465	-0.0589	0.0286	0.0014	-0.0372	0.0035
	[0.0794]	[0.0519]	[0.0614]	[0.0793]	[0.0636]	[0.0494]	[0.0586]	[0.0643]	[0.0023]
EU GDP S	-0.0015	0.0160	0.0066	-0.0156	-0.0070	0.0036	0.0163	-0.0240	0.0007
	[0.0342]	[0.0163]	[0.0261]	[0.0346]	[0.0243]	[0.0260]	[0.0289]	[0.0306]	[0.0011]

**Continuing Table 18:**

EU GDP F	-0.0565** [0.0241]	-0.0119 [0.0106]	-0.0177 [0.0151]	-0.0348 [0.0220]	-0.0138 [0.0159]	0.0598*** [0.0173]	0.0159 [0.0137]	0.1476*** [0.0192]	0.0022** [0.0008]
EU CPI	0.0761* [0.0455]	-0.0273 [0.0495]	-0.0096 [0.0429]	0.0086 [0.0609]	0.0175 [0.0416]	-0.0188 [0.0316]	0.0168 [0.0321]	0.0187 [0.0415]	-0.0001 [0.0015]
EU PPI	0.2028*** [0.0438]	0.0072 [0.0461]	0.1173** [0.0552]	0.1756*** [0.0619]	-0.0721 [0.0556]	-0.0555 [0.0334]	0.0144 [0.0460]	0.0157 [0.0536]	-0.0029 [0.0018]
EU Unempl. Rate	-0.0299 [0.0727]	0.0060 [0.0660]	0.0095 [0.0789]	-0.0414 [0.0911]	0.0030 [0.0774]	0.0283 [0.0500]	-0.0208 [0.0590]	-0.0252 [0.0777]	0.0033 [0.0025]
EU Business Climate	0.1503* [0.0885]	-0.0332 [0.1317]	0.1722 [0.1475]	0.1245 [0.1760]	-0.0391 [0.1567]	-0.0808 [0.0903]	-0.0116 [0.1174]	0.2914** [0.1418]	-0.0029 [0.0075]
EU Ind. Prod.	0.2461* [0.1328]	0.1853* [0.0999]	0.3626*** [0.1062]	0.0005 [0.1594]	-0.0298 [0.1038]	-0.0064 [0.0976]	-0.0081 [0.0900]	0.0093 [0.1097]	0.0024 [0.0041]
EU Econ. Conf.	0.0535 [0.1320]	0.0835 [0.1569]	0.3183* [0.1757]	0.1097 [0.2238]	-0.0988 [0.1725]	-0.0047 [0.1337]	-0.1221 [0.1634]	-0.0839 [0.1648]	0.0186*** [0.0056]
EU Ind. Conf.	1.0991*** [0.2755]	-0.2406 [0.2984]	1.7614*** [0.3325]	0.3607 [0.4198]	1.2532*** [0.3262]	-0.2023 [0.2444]	-0.0558 [0.3098]	0.0010 [0.3114]	-0.0109 [0.0093]
EU Cons. Conf.	-0.1647 [1.0040]	0.1356 [1.4313]	-8.1166*** [1.6080]	1.8813 [2.0071]	11.2640*** [1.5740]	1.8239 [1.1540]	-5.0810*** [1.4966]	-3.8061** [1.5067]	0.0316 [0.0352]
EU Retail Sales	0.4729*** [0.0778]	-0.1101 [0.0750]	-0.0094 [0.1275]	0.1241 [0.1103]	-0.0051 [0.1103]	-0.0847 [0.0648]	0.2368** [0.0907]	0.1645 [0.1067]	-0.0058 [0.0042]
EU M3	0.2035*** [0.0374]	0.0586 [0.0384]	0.0154 [0.0401]	0.0088 [0.0502]	-0.0357 [0.0391]	0.0153 [0.0246]	-0.0122 [0.0298]	-0.0790** [0.0390]	-0.0005 [0.0013]
EU M3 3mth avg	0.1391** [0.0613]	0.0329 [0.0717]	-0.0892 [0.0749]	0.2070** [0.0905]	-0.0559 [0.0738]	-0.0860** [0.0385]	0.0622 [0.0576]	-0.0967 [0.0722]	-0.0013 [0.0030]
DE CPI	-0.0962*** [0.0261]	-0.0068 [0.0262]	0.0166 [0.0323]	-0.0370 [0.0454]	-0.0116 [0.0350]	0.0636* [0.0337]	-0.0030 [0.0391]	-0.0167 [0.0298]	0.0063*** [0.0009]
DE PPI	0.2781*** [0.0405]	0.0489 [0.0495]	0.0934** [0.0435]	0.0518 [0.0631]	-0.0332 [0.0438]	-0.0173 [0.0282]	0.0126 [0.0396]	-0.0144 [0.0426]	-0.0031** [0.0014]
DE Unempl. Rate	0.0714*** [0.0151]	-0.0067 [0.0158]	-0.0027 [0.0197]	0.0122 [0.0221]	-0.0164 [0.0185]	-0.0049 [0.0115]	0.0004 [0.0154]	-0.0067 [0.0168]	-0.0005 [0.0005]
DE Ind. Prod.	1.0508*** [0.1671]	0.1413 [0.1396]	0.5236*** [0.1462]	0.1946 [0.2236]	0.4336*** [0.1600]	-0.2123 [0.1535]	-0.8082*** [0.2077]	-0.0857 [0.1267]	-0.0124*** [0.0045]
IFO Bus. Climate	0.9259*** [0.2352]	-0.0191 [0.1242]	0.2575 [0.1557]	-0.0170 [0.2405]	-0.0738 [0.1720]	0.2051 [0.2324]	-0.0205 [0.2243]	-0.0147 [0.1361]	-0.0103* [0.0059]

**Continuing Table 18:**

ZEW DE Expectation	4.1389*** [1.0382]	1.5952* [0.8315]	1.7693** [0.8688]	-2.1759* [1.1601]	0.6763 [0.8612]	0.5345 [0.7122]	0.2550 [0.6903]	-0.7452 [0.8521]	-0.0028 [0.0284]
ZEW DE Curr. Situation	1.4313 [0.8736]	0.0128 [0.9159]	0.1543 [1.1402]	0.2421 [1.7829]	1.1725 [1.2779]	0.8856 [1.7122]	2.5966 [1.6476]	-0.9122 [1.0091]	0.0936* [0.0494]
DE Retail Sales	0.5420*** [0.0636]	0.0177 [0.1299]	-0.2130 [0.1318]	-0.2627 [0.1620]	0.0281 [0.1532]	0.3752*** [0.0751]	0.0119 [0.1051]	-0.1610 [0.1231]	0.0028 [0.0028]
DE Current Account	2.3024*** [0.3547]	0.4787 [0.4924]	-0.8111 [0.5150]	-0.2972 [0.6243]	0.3298 [0.5004]	-0.1417 [0.2859]	0.2414 [0.3976]	-0.0318 [0.4929]	-0.0510* [0.0300]
DE Trade Balance	1.5297*** [0.2295]	-0.1229 [0.2335]	-0.1015 [0.2452]	0.5304* [0.2988]	0.1579 [0.2411]	-0.0783 [0.1373]	-0.1580 [0.1865]	-0.2378 [0.2371]	-0.0137 [0.0116]

Source: Bloomberg, own calculation.

Note: Coefficients significantly different from 0 at 1%, 5%, and 10% significance level are distinguished with \*\*\*, \*\*, and \*. Brackets denote OLS standard errors. Indicators for which the reporting period coincides with the release period are not considered in this specification due to collinearity.

**Table 19: Expectations formation with respect to the initial announcement**

<i>Indicators</i>	Extrapolative Expectations							Adaptive Expectations						
	$\alpha$	$\beta_1$	$\beta_2$	<i>p</i> – Values for $H_0$			$R^2$	$\alpha$	$\beta_1$	$\beta_2$	<i>p</i> – Values for $H_0$			$R^2$
				$\beta_2 > 0$	$\beta_2 < 0$	$\beta_2 = 0$					$\beta_1 + \beta_2 > 1$	$\beta_1 + \beta_2 < 1$	$\beta_1 + \beta_2 = 1$	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
Bus. Inventories	0.0513* [0.0246]	0.7876* [0.0473]	-0.2595 [0.0803]	<b>0.00</b>	1.00	<b>0.00</b>	0.81	0.0315 [0.0217]	0.6908* [0.1160]	0.2062* [0.0945]	<b>0.02</b>	0.98	<b>0.03</b>	0.84
CPI	0.0982* [0.0378]	0.4780* [0.1176]	0.2127 [0.1129]	0.97	<b>0.03</b>	0.06	0.48	0.0658 [0.0585]	0.291 [0.4781]	0.2844 [0.3222]	<b>0.02</b>	0.98	<b>0.04</b>	0.39
Factory Orders	0.1136 [0.2160]	-0.1908* [0.2237]	0.0809 [0.1314]	0.73	0.27	0.54	<b>0.02</b>	0.1546 [0.1932]	-0.5363 [0.3398]	0.3583 [0.3261]	<b>0.00</b>	1.00	<b>0.00</b>	0.05
ISM Prices Paid	5.2167* [1.2279]	0.9090* [0.0187]	0.142 [0.0409]	1.00	<b>0.00</b>	<b>0.00</b>	0.97	4.9486* [1.3265]	-0.1134* [0.0567]	1.0256* [0.0588]	<b>0.00</b>	1.00	<b>0.00</b>	0.96
Import Price Index	0.0397 [0.1410]	0.6050* [0.1302]	-0.0959 [0.0982]	0.17	0.83	0.33	0.49	0.1221 [0.1282]	0.8004 [0.4043]	-0.0753 [0.2762]	0.07	0.93	0.14	0.50
Industrial Prod.	0.1558* [0.0473]	0.4554* [0.1080]	-0.2521 [0.0838]	<b>0.00</b>	1.00	<b>0.00</b>	0.35	0.0435 [0.0456]	0.9745* [0.1737]	-0.2326 [0.1320]	<b>0.00</b>	1.00	<b>0.01</b>	0.49
Leading Indic.	0.1244* [0.0418]	0.3615* [0.0946]	-0.1887 [0.0800]	<b>0.01</b>	0.99	<b>0.02</b>	0.13	0.0867* [0.0387]	0.8132* [0.2849]	-0.3582 [0.2263]	<b>0.00</b>	1.00	<b>0.00</b>	<b>0.17</b>
Retail Sales	0.1831 [0.0962]	0.1932* [0.1715]	-0.1528 [0.0806]	<b>0.03</b>	0.97	0.06	<b>0.04</b>	0.2373* [0.0891]	0.0418 [0.1909]	0.0114 [0.1515]	<b>0.00</b>	1.00	<b>0.00</b>	<b>0.00</b>

## Continuing Table 19:

Retail Sales ex Auto	0.2524*	0.2917*	-0.1785	<b>0.00</b>	1.00	<b>0.00</b>	0.25	0.1440*	0.7002*	-0.0853	<b>0.00</b>	1.00	<b>0.01</b>	0.41
	[0.0549]	[0.1208]	[0.0599]					[0.0633]	[0.1551]	[0.0846]				
DE Ind. Prod.	0.2449*	0.3601*	-0.2013	<b>0.00</b>	1.00	<b>0.00</b>	0.29	-0.0848	0.9443*	-0.1829*	<b>0.02</b>	0.98	<b>0.05</b>	0.60
	[0.1119]	[0.0907]	[0.0677]					[0.0960]	[0.1236]	[0.0600]				
DE Retail Sales	0.3091*	-0.4740*	0.1349	1.00	<b>0.00</b>	<b>0.01</b>	0.60	0.0336	0.5031*	-0.4146*	<b>0.00</b>	1.00	<b>0.00</b>	0.69
	[0.0845]	[0.0927]	[0.0467]					[0.0755]	[0.0949]	[0.0385]				
DE Unempl. Rate	-0.0082	1.0011	0.2142	1.00	<b>0.00</b>	<b>0.00</b>	<b>1.00</b>	-0.0382	-0.1088	1.1127*	0.78	0.22	0.43	<b>1.00</b>
	[0.0480]	[0.0050]	[0.0411]					[0.0482]	[0.0629]	[0.0638]				
EU PPI	0.1315*	0.4904*	-0.1563	<b>0.05</b>	0.95	0.11	0.32	0.1725*	-0.4574	0.8050*	<b>0.00</b>	1.00	<b>0.00</b>	0.32
	[0.0479]	[0.1047]	[0.0959]					[0.0479]	[0.3546]	[0.2671]				
EU Retail Sales	0.0878	-0.3106*	-0.0866	0.16	0.84	0.32	0.39	0.1518*	-0.1856	-0.3053*	<b>0.00</b>	1.00	<b>0.00</b>	0.27
	[0.0544]	[0.1193]	[0.0858]					[0.0551]	[0.1444]	[0.1051]				
EU Unempl. Rate	-0.1325*	1.0172*	0.2794	1.00	<b>0.00</b>	<b>0.00</b>	<b>1.00</b>	-0.1934*	-0.1313	1.1562*	1.00	<b>0.00</b>	<b>0.00</b>	<b>1.00</b>
	[0.0510]	[0.0060]	[0.0618]					[0.0525]	[0.0740]	[0.0752]				

Source: Bloomberg, own calculation.

Note: \* indicates that the null hypothesis  $H_0: (\alpha = \beta_2 = 0, \beta_1 = 1)$  have to be rejected at a 5% significance level. Brackets denote heteroskedasticity-robust standard errors.

**Table 20: Expectations Formation with Respect to the Latest Revision**

<i>Indicators</i>	Extrapolative Expectations							Adaptive Expectations						
	$\alpha$	$\beta_1$	$\beta_2$	<i>p</i> – Values for $H_0$			$R^2$	$\alpha$	$\beta_1$	$\beta_2$	<i>p</i> – Values for $H_0$			$R^2$
				$\beta_2 > 0$	$\beta_2 < 0$	$\beta_2 = 0$					$\beta_1 + \beta_2 > 1$	$\beta_1 + \beta_2 < 1$	$\beta_1 + \beta_2 = 1$	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
Bus. Inventories	0.0728*	0.6096*	-0.1743	<b>0.01</b>	0.99	<b>0.03</b>	0.75	0.0333	0.7823*	0.1034	<b>0.01</b>	0.99	<b>0.02</b>	0.83
	[0.0282]	[0.0422]	[0.0767]					[0.0223]	[0.1148]	[0.0869]				
CPI	0.1338*	0.2547*	0.1335	0.83	0.17	0.34	<b>0.15</b>	0.0517	0.7906*	-0.1667	<b>0.02</b>	0.98	<b>0.04</b>	0.40
	[0.0598]	[0.2057]	[0.1388]					[0.0515]	[0.1374]	[0.1480]				
Factory Orders	0.0417	0.2287*	-0.274	<b>0.00</b>	1.00	<b>0.00</b>	<b>0.09</b>	0.1533	-0.1648	0.0227	<b>0.00</b>	1.00	<b>0.00</b>	0.03
	[0.2045]	[0.1426]	[0.0940]					[0.2043]	[0.1052]	[0.1252]				
ISM Prices Paid	6.0931*	0.8957*	0.1544	1.00	<b>0.00</b>	<b>0.00</b>	0.96	6.1680*	-0.1256*	1.0196*	<b>0.00</b>	1.00	<b>0.00</b>	0.96
	[1.5138]	[0.0226]	[0.0415]					[1.6199]	[0.0581]	[0.0604]				
Import Price Index	0.1455	0.3469*	0.1804	0.91	0.09	0.17	0.31	0.1195	0.6978*	0.0141	<b>0.04</b>	0.96	0.08	0.50
	[0.1648]	[0.1263]	[0.1303]					[0.1287]	[0.1625]	[0.1040]				
Industrial Prod.	0.1833*	0.4407*	-0.1952	<b>0.00</b>	1.00	<b>0.01</b>	0.41	0.0871	0.5534*	0.1599*	<b>0.00</b>	1.00	<b>0.01</b>	0.52
	[0.0412]	[0.0633]	[0.0734]					[0.0455]	[0.1160]	[0.0526]				
Leading Indic.	0.0918	0.2626*	-0.0449	0.29	0.71	0.58	0.13	0.0552	0.2519*	0.1953*	<b>0.00</b>	1.00	<b>0.00</b>	0.21
	[0.0507]	[0.0875]	[0.0806]					[0.0422]	[0.1153]	[0.0734]				
Retail Sales	0.175	0.2039*	-0.0285	0.34	0.66	0.69	<b>0.07</b>	0.2089*	0.016	0.1711*	<b>0.00</b>	1.00	<b>0.00</b>	0.07
	[0.0918]	[0.0971]	[0.0702]					[0.0837]	[0.1463]	[0.0681]				

## Continuing Table 20:

Retail Sales ex Auto	0.2706*	0.2202*	-0.0702	<b>0.04</b>	0.96	0.08	0.27	0.1517*	0.4969*	0.0883*	<b>0.00</b>	1.00	<b>0.01</b>	0.43
	[0.0464]	[0.0733]	[0.0398]					[0.0642]	[0.1650]	[0.0371]				
DE Ind. Prod.	0.1476	0.4047*	-0.1793	<b>0.02</b>	0.98	<b>0.04</b>	0.28	0.0423	0.6636*	0.1228*	<b>0.03</b>	0.97	0.06	0.57
	[0.1198]	[0.1085]	[0.0861]					[0.0941]	[0.0942]	[0.0542]				
DE Retail Sales	0.5183*	0.0619*	-0.0459	0.25	0.75	0.51	<b>0.01</b>	0.4898*	-0.1615	-0.0501	<b>0.00</b>	1.00	<b>0.00</b>	0.01
	[0.1232]	[0.1203]	[0.0689]					[0.1209]	[0.1802]	[0.0681]				
DE Unempl. Rate	0.0338	0.9937	0.3981	1.00	<b>0.00</b>	<b>0.00</b>	0.99	-0.1385	0.7603*	0.2507	0.85	0.15	0.31	0.99
	[0.0908]	[0.0100]	[0.1067]					[0.0994]	[0.1972]	[0.1919]				
EU PPI	0.1473*	0.3820*	-0.1866	<b>0.04</b>	0.97	0.07	0.23	0.1160*	0.3539*	0.1689*	<b>0.00</b>	1.00	<b>0.00</b>	0.28
	[0.0497]	[0.0910]	[0.1015]					[0.0493]	[0.1332]	[0.0775]				
EU Retail Sales	0.0854	0.2915*	-0.1901	0.08	0.92	0.16	<b>0.06</b>	0.1917*	-0.4718*	-0.0638	<b>0.00</b>	1.00	<b>0.00</b>	0.17
	[0.0667]	[0.2522]	[0.1331]					[0.0588]	[0.1394]	[0.0883]				
EU Unempl. Rate	-1.0234*	1.1089*	-0.3167	<b>0.01</b>	0.99	<b>0.01</b>	0.92	-0.0305	1.0121*	-0.0066	0.65	0.35	0.70	0.98
	[0.2272]	[0.0250]	[0.1225]					[0.1254]	[0.0542]	[0.0579]				

Source: Bloomberg, own calculation.

Note: \* indicates that the null hypothesis  $H_0: (\alpha = \beta_2 = 0, \beta_1 = 1)$  have to be rejected at a 5% significance level. Brackets denote heteroskedasticity-robust standard errors.