

Predicting the macroeconomic effects of abstract and concrete events

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Abstract

This paper presents experimental evidence that non-experts do not distinguish between macroeconomically relevant and irrelevant events in the way economic theory would suggest. Students were asked to predict the likely consequences of several events in fictitious newspaper reports on GDP, inflation, unemployment, and aggregate sales. They overestimate the effects of irrelevant events, especially if those events are easy to imagine. The magnitudes of the predicted effects are clearly related to the concreteness of the events. The results are compatible with the use of the availability heuristic in the process of forming economic expectations.

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1. Introduction

How do lay people form macroeconomic expectations? Empirical evidence suggests that consumers form different expectations than experts (Carroll, 2003; Döpke et al., 2006, 2005; Roos, 2005). Unfortunately, economic theory tells us little about actual expectation formation processes. In most economic models, agents think about the economy in terms of economic models and rationally evaluate the consequences of events using economic theory only.

There are two potential reasons why lay expectations differ from expert expectations. On the one hand, lay people may have mental models of the economy that differ from those of experts with respect to the relevant variables and the causal relationships between them. On the other hand, due to their lack of expertise lay people may rely more on intuitive reasoning or on conclusions by analogy than on theoretical analysis of economic processes. This different way of forming economic expectations could be much more subject to the influence of emotions than the expectation formation process of experts.

This paper presents the results of an experiment designed to investigate two questions related to the formation of macroeconomic predictions by individuals who are not economic experts. The first question is: Which kinds of news do non-expert readers of newspapers consider to be relevant for the macroeconomy? It may be the case that lay people

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consider other events to be relevant for the macroeconomy than experts do. If lay people really regard other events as relevant, it is important to learn whether we can describe how they think. Kahneman and Tversky (1973) have shown that the perceived likelihood of events depends on the ease with which people remember or construct relevant instances. If non-experts form economic expectations using this *availability heuristic*, events that are easy to imagine will be expected to have a larger impact on the economy than events that are difficult to imagine.

Secondly, I analyze whether affects influence macroeconomic predictions. If people have little knowledge about the economy, it is reasonable to expect them not to form their expectations on the basis of theoretical economic models. One potential way in which expectations might be formed is by use of the *affect heuristic* (Finucane et al., 2000), i.e. the use of good or bad feelings arising in an evaluation or decision-making process. A positive feeling caused by an event might induce the subject to predict favorable macroeconomic consequences.

The answers to these questions may be important for both macroeconomics and political economics. The events which influence macroeconomic fluctuations and political elections could be different from those traditionally considered in economic theory. If many people believe that some events are important and others are not, this belief might be self-fulfilling. As Duffy and Fisher (2005) have recently shown experimentally, subjects are ready to coordinate economic decisions using non-economic signals. They also argue that such signals need a meaningful context in order to influence economic behavior. Since the macroeconomy is not directly observable, people heavily rely on what they learn in the mass media. For many people the mass media, especially TV and newspapers, are the only source of knowledge about economics and politics. However, the mass media are not only transporting information about events, but also interpretations what these events mean and explanations how the economy works. For this reason, one might expect that some news spread by the mass media can serve as sunspots that coordinate people's actions (see Farmer, 1999, p. 225, for the same argument).

Some evidence for the importance of affects on economic expectations is provided by Dohmen et al. (2006). These authors show that German consumers had significantly more positive expectations about their own future income and about macroeconomic conditions after each match of the German team at the FIFA soccer world cup in Germany 2006. While Dohmen et al. do not explicitly explain their findings by the impact of affects, it seems obvious that the extraordinarily positive feelings among Germans after the unexpectedly successful matches of the German team are an important factor.

In order to find out which kinds of events are economically relevant from the point of view of non-experts, I presented several fictitious newspaper reports about economic and non-economic events to undergraduate students and asked them to predict the likely consequences of those events on macroeconomic variables. Whether affects influenced those predictions was tested with three different versions of the texts, among which two versions were designed to induce positive or negative affective responses in readers. I then tested whether the predictions differ between the groups.

The paper is structured as follows: Section 2 discusses related literature and the hypotheses to be tested experimentally. Section 3 describes the design of the experiment and the participants and Section 4 states the results. Section 5 concludes.

2. Availability, affects, and expectations

The main goal of this paper is to explore, how naive subjects form expectations about the economic consequences of different events. An economist would probably interpret an event as a shock to an economic variable and then trace the effects of this variable change through an appropriate economic model.

Lay people are unlikely to have elaborate models of the economy. They may have some intuition about relationships between certain variables, but lay theories are usually not coherent and consistent in the sense that they are without internal contradictions (see Furnham, 1988, p. 3). But more or less consistent theories are not necessary for lay persons to form expectations. An alternative way is to use simple heuristics such as the availability heuristic and the affect heuristic.

The availability heuristic was introduced by Kahneman and Tversky (1973) as a way how people evaluate the frequency of classes or the probability of events. Tversky and Kahneman found that events for which instances or associations are easy to recall or to imagine are judged to be more frequent than events which are more difficult to imagine. In Kahneman and Tversky (1982), they describe the *simulation heuristic* as a special case of the availability heuristic. This heuristic is used to perform tasks such as counterfactual assessments, assessments of causality, or

assessments of conditioned probabilities. Individuals construct — as opposed to recall — scenarios that link starting conditions to outcomes and use the ease with which such a simulation of a system reaches a certain state as an assessment how likely the real system generates that state.

This simulation heuristic is especially suited to generate economic predictions after particular events. An event is a change in the starting conditions. An individual that is asked to predict how the event affects an economic variable tries to construct a scenario linking the event to the variable in question. If it is easy to construct such a scenario, the individual will predict a strong impact of the event on the variable. If the individual finds it difficult to perform such a simulation, the predicted effect will be small or even zero.

In order to get to a testable hypothesis, I need conditions for the ease to construct simulation scenarios. Nisbett et al. (1982, p. 112) argue that concrete, vivid, and salient information is more powerful to call up schemas involving similar information than abstract information, which has less potential connections to the associative networks by which such schemas or scripts can be activated. I therefore hypothesize that concrete events that are easy to imagine have more power to invoke schemas in which similar simulations are performed. A concrete event thus makes it easy to perform a simulation so that a strong effect of the event on the variables in question is predicted. In contrast, abstract events do not automatically activate associative networks so that it is hard to run a simulation and the predicted effects are small.

A second rule of thumb that might help lay persons to form economic predictions is the affect heuristic as described by Finucane et al. (2000) and Slovic et al. (2004). According to these authors, mental representations of events are connected with affects of varying degrees. In the process of making judgments, people base their judgments of risk and expected benefits on the valence of affects associated with the event. Positive affects lead to higher perceived benefits and lower perceived risks and vice versa. A very similar finding was reported by Johnson and Tversky (1983) who show that induced negative and positive affects influence lay persons' perceptions of risks. Johnson and Tversky induced affects in subjects by brief newspaper reports and asked subjects to estimate the frequency of many different risks. Negative affects increased the estimated frequencies and positive affects decreased them. Interestingly, this was not only found for risks related to the newspaper story, but the induced affects were generalized to the estimation of all kinds of risks.

If people use the affect heuristic to form economic expectations, newspaper reports that induce negative affects should lead to more pessimistic expectations than positive reports. Affects might be triggered either by the content or the framing of newspaper reports. Another indication that the affect heuristic is used may be varying degrees of confidence in the correctness of the predictions. Suppose a subject reached the conclusion that an event will have a positive effect on an economic variable, either by theoretical considerations or by use of the availability heuristic. Positive or negative affects induced by the framing of the newspaper report may strengthen confidence in the former case but weaken it in the latter. A positive gut feeling or emotion would generate a signal that is in line with the prediction produced in a different way. A negative feeling, however, would create an internal conflict between the expectation formation processes, which might cause subjects to be uncertain about the correctness of their prediction.

3. Experimental design

Eight fictitious newspaper reports¹ were presented to 136 undergraduate students at the University of Dortmund in November 2006. The students took a course in introductory macroeconomics and were familiar with the macroeconomic variables GDP, the rate of inflation, the rate of unemployment, and aggregate sales, but at the time of the experiment, they had not been taught macroeconomic models.

Four of the events described in the reports are clearly relevant for macroeconomic variables: a strong and lasting appreciation of the euro against the U.S. dollar, a major tax increase to reduce government debt, a surprisingly strong increase of interest rates by the European Central Bank, and a large increase of the oil price, which is expected to be permanent. According to standard macroeconomic models all of these events can be expected to have a significant impact on GDP, inflation, unemployment, and sales within one year after their occurrence.

The second half of reports covers events that current standard macroeconomics would classify as irrelevant for the economy as a whole. The first event, an oil spill at the German coast due to a tanker accident, definitely would affect the regional economy, but is very unlikely to move the economic variables at the national level, since the affected region

¹ An appendix with the complete text both in German and in an English translation are available upon request or can be downloaded from <http://www.wiso.uni-dortmund.de/mak/de/content/team/mitarbeiter/roos.html>.

Table 1
Classes of events in the dimensions relevant/irrelevant and concrete/abstract

		Concrete	Abstract
Macroeconomically	Relevant	MC	MA
	Irrelevant	NC	NA

and sectors are far too small. The second event is a relocation of a single truck plant from a German town abroad with a potential loss of 12,000 jobs. Again, such an event would have a large impact on the affected region, but not on the aggregate. A reform of the German judicial system, which is the third event irrelevant from a macroeconomic perspective, would not even have regional effects. One might argue that enhanced efficiency of the jurisdiction might have long-term growth effects, but short-run effects within one year are not plausible. The same is true for the last non-economic event, which is an agreement between the European Commission and Ukraine to cooperate in criminal prosecution.

The students were told to participate in a survey study about how people evaluate economic news. They were asked to read the texts and to indicate the likely short-run (one year) consequences of the events on four macroeconomic variables in Germany: GDP, the inflation rate, the unemployment rate, and aggregate sales. It was emphasized that they should predict the consequences at the *national* level. Below every news report there was a table containing the four variables and a scale from +3 (increases strongly) to −3 (decreases strongly). The students were asked to mark the most likely number and to write their level of confidence concerning their prediction as a percentage number between 0% (fully uncertain) and 100% (absolutely certain) in a box. In order to give an incentive to answer all the questions seriously, three times € 20 were randomly allotted among all participants who had returned a completely filled questionnaire.

3.1. Concreteness vs. abstractness

I hypothesize that concrete events have more power to activate schemas and thus make mental simulations easier than abstract events. The eight events are chosen such that they differ in the two dimensions macroeconomically relevant/irrelevant and concrete/abstract. These two dimensions generate a matrix of four different classes of events, which are presented in Table 1.

Based on a-priori reasoning, I assign two events to each cell of this matrix: the tax increase and the oil shock to MC, the ECB interest rate increase and the euro appreciation to MA, the oil pollution and the plant relocation to NC, and the EU cooperation agreement and the judicial reform to NA. In order to test whether this classification of events in the concreteness/abstractness dimension is valid, I tried to obtain an objective measure of concreteness. The terms describing the events were shown to a group of 19 freshmen students before the start of their studies. They saw a projection of the words on the classroom wall for 30 s and were asked to write down all terms that came to their minds when reading the words. The students were financially rewarded according to the number of associations they had written down. The average number of associated terms is a rough measure of how easy it was for these students to imagine the

Table 2
Description of events; associations: average number of words freely associated in a test group

Code	Event	Relevant	Associations	Class
Oil	Oil price shock	Yes	5.11	MC
Tax	Tax increase	Yes	4.16	MC
Ecb	ECB interest rate increase	Yes	3.68	MA
Euro	Appreciation of euro	Yes	2.68	MA
Pollution	Oil spill at the coast	No	5.58	NC
Plant	Relocation of truck plant	No	5.11	NC
Agreement	EU cooperation agreement	No	4.37	NA
Reform	Judicial reform	No	3.74	NA

events. Table 2 shows that the average number of associations varies between the events in the expected manner. Unfortunately, the EU cooperation agreement with Ukraine generated more associations than the tax increase and the number of terms associated with the tax increase is not significantly larger than the number of associations related to the interest rate increase.² But at least within the categories of relevant and irrelevant events, the ranking corresponds to the expected one. Taking the average number of all associations within each of the four groups shows that there are significantly more associations in MC than in MA (4.63 vs. 3.18, $p < 0.001$) and in NC than in NA (5.34 vs. 4.05, $p = 0.002$). The difference between MC and NA is also weakly significant ($p = 0.095$).

If the concreteness of events has a significant influence on subjects' macroeconomic predictions, then we will reject the null hypotheses:

$$(H1). |x^{MC}| < |x^{MA}|$$

$$(H2). |x^{NC}| < |x^{NA}|,$$

where x is the predicted effect on the macroeconomic variables.

The second interesting question is whether, independently of concreteness, naive subjects distinguish events that are relevant and irrelevant from a theoretic perspective. If they do, we will reject the null hypotheses:

$$(H3). |x^{MC}| < |x^{NC}|$$

$$(H4). |x^{MA}| < |x^{NA}|.$$

If subjects interpret the events as economists would do, the predictions for all variables in the categories NC and NA will not be significantly different from zero.

3.2. *Affects*

In order to analyze the potential effects of feelings, I distributed three different versions of the newspaper reports. In the base version (47 subjects), the description of the events was as factual as possible and words with strong emotional valence were avoided. In two treatment groups (47 and 42 subjects), I tried to induce affects by additional short paragraphs of two sentences with affective cue words, which have a strong positive or negative emotional valence. Each affective paragraph contained about four cue words³ whose affective valence was determined using word norms (see Hager, 1994). I also attempted not to present any information that could objectively be interpreted as additional information useful to make the predictions. For each event there were two versions of the affective paragraph, one with positive valenced cues and another with negative ones. For example, the affective paragraph following the report of the ECB interest rate increase mentions a survey study on the acceptance of the euro among the citizens of the euro area. In the positive framing, it is reported that the acceptance had increased and that the euro is seen as a symbol for peace, stability, and home. In the negative framing, the text mentions a decreased acceptance and conflict, instability, and heteronomy as negative affective cue words. In the two treatment groups, the positive and negative affective paragraphs alternated, starting in the first group with positive and in the second group with negative cue words. This alternation of positively and negatively framed paragraphs served not to make subjects wary, what might have been the case if every text in a group had ended with positive or negative cues words only.

The control group with the base versions of the reports serves as a bench-mark for the treatment groups. If subjects use the affect heuristic and if the affective paragraphs successfully trigger affects, the average predicted values of the target variables will be larger in the group with the positively framed texts and lower in the group with negatively valenced cue words. In addition, I expect subjects' confidence in the correctness of the predictions to be higher, if the affective cues reinforce the direction of the predicted effects, but lower if the affect heuristic produces predictions in the opposite direction than those of other mental processes. If, for example, the subjects in the control group expect that the appreciation of the euro against the U.S. dollar lowers GDP, the subjects with the positive affective cues will expect a

² A reviewer suggested that learning could have made students better at the association task over time. I tested for learning effects by comparing the average number of associations for the first half of terms with the average for the second half. Only three students produced significantly (5%) more associations for the second half of terms. For 15 students there was no difference and one student associated more words at the beginning of the task.

³ The cue words are underlined in the Appendix.

Table 3

Mean predictions and associated levels of confidence; standard errors in parentheses; control group, 47 observations; asterisks indicate significant difference from zero in *t*-test: * 10%, ** 5%, *** 1%

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Relevant events				Irrelevant events			
	Tax	Euro	Ecb	Oil	Agreement	Pollution	Plant	Reform
GDP	−0.64*** (0.16)	0.60*** (0.18)	−0.30* (0.16)	−1.10*** (0.19)	0.43*** (0.09)	−1.23*** (0.12)	−1.15*** (0.15)	0.17* (0.09)
Conf.	45.32	58.09	47.55	58.75	55.15	62.87	65.63	53.62
IR	0.34** (0.15)	−0.34* (0.20)	−0.04 (0.22)	1.10*** (0.18)	0 (0.04)	0.38*** (0.13)	0.13 (0.08)	0.06 (0.05)
Conf.	44.47	54.96	56.81	58.23	53.83	57.13	49.89	54.57
UR	0.36** (0.14)	0.02 (0.11)	0.15 (0.09)	0.79*** (0.15)	−0.49*** (0.13)	0.49*** (0.15)	1.08*** (0.24)	0 (0.12)
Conf.	58.91	53.83	49.46	64.06	57.45	66.79	80.21	60.11
Sales	−1.64*** (0.13)	0.53*** (0.13)	−0.43*** (0.15)	−1.15*** (0.16)	0.53*** (0.13)	−1.04*** (0.14)	−0.83*** (0.13)	0.11 (0.08)
Conf.	71.91	56.28	51.63	66.56	61.70	69.36	64.74	65.21

smaller decrease in GDP, but with lower confidence, and the subjects with the negative affective cues will predict a larger decrease with higher confidence.

4. Results

Table 3 contains the average predicted effects on the four variables by the subjects in the control group. I start the discussion with the predicted effects of the non-economic events. The only event which subjects expect to have no significant impact on macroeconomic variables is the judicial reform (column 8). The *t*-tests show that only the predicted effect on GDP is weakly significantly different from zero. All other three events are believed to have significant macroeconomic effects. Surprisingly, subjects believe that the oil pollution and the plant relocation would have the largest effects on GDP among all eight events and they also predict large effects on the unemployment rate and sales. The predicted effects of the EU cooperation agreement are smaller, but still significantly larger than zero. Notice that subjects expect an increase in GDP and sales and a decrease in the unemployment rate after the agreement. They might evaluate an agreement to cooperate as positive and therefore expect positive effects on the variables. It is also interesting that students expect no event except for the oil pollution to have an influence on the rate of inflation.

Turning to the macroeconomically relevant events, we have two remarkable results. First, an increase in the interest rate by the ECB would have little impact on the economy according the participants of the study. They only expect a small reduction in sales and an almost insignificant decrease of GDP. Neither the rate of inflation nor the unemployment rate would react to higher interest rates. Second, students predict an increase in GDP after an appreciation of the euro against the dollar. While there might be a J-curve effect in the very short run after an

Table 4

Mean predictions for the two events in each class; standard errors in parentheses; control group, 47 observations; asterisks indicate significant difference from zero in *t*-test: * 10%, ** 5%,*** 1%

	MC	MA	NC	NA
GDP	−1.70*** (0.26)	0.30 (0.24)	−2.43*** (0.22)	0.60*** (0.12)
IR	1.40*** (0.25)	−0.38 (0.30)	0.51*** (0.18)	0.06 (0.06)
UR	1.13*** (0.24)	0.17 (0.12)	1.64*** (0.33)	−0.49*** (0.17)
Sales	−2.74*** (0.19)	0.11 (0.14)	−1.94*** (0.20)	0.64*** (0.19)

Table 5

Hypothesis testing; p -values of two-sample t -tests on equal means of absolute predictions between classes; control group, 47 observations

	(1)	(2)	(3)	(4)	(5)
H_0	$ x^{MC} - x^{MA} = x^{MA} - x^{MA} $	$ x^{NC} - x^{NA} = x^{NA} - x^{NA} $	$ x^{MC} - x^{NC} = x^{NC} - x^{NC} $	$ x^{MA} - x^{NA} = x^{NA} - x^{NA} $	$ x^{MA} - x^{NC} = x^{NC} - x^{NC} $
H_a	$ x^{MC} - x^{MA} > x^{MA} - x^{MA} $	$ x^{NC} - x^{NA} > x^{NA} - x^{NA} $	$ x^{MC} - x^{NC} > x^{NC} - x^{NC} $	$ x^{MA} - x^{NA} > x^{NA} - x^{NA} $	$ x^{MA} - x^{NC} > x^{NC} - x^{NC} $
GDP	0.037	0.000	0.804	0.000	0.995
IR	0.680	0.000	0.000	0.000	0.000
UR	0.000	0.000	1.000	1.000	1.000
Sales	0.000	0.000	0.000	0.001	0.970

appreciation, the effect is likely to be negative within one year due to adjustments of exports and imports. The predicted effects of the increase in taxes and the soaring oil price are significantly different from zero and plausible, although their magnitude is relatively moderate compared to the expected effects of the non-economic events. Among the economic events, the oil price shock is the most important one, because its expected consequences on GDP, inflation, and unemployment are much larger than the effects of the tax increase.

Note that some of the large predictions are easy to explain. The two largest effects on sales are predicted after the tax increase and the oil shock. Subjects seem to expect both events to raise prices, which is confirmed by the predicted increase in inflation. In addition, subjects might expect sales to decrease after the tax rise due to lower disposable income. It is also evident why subjects predict that the announcement to close a truck plant and to make workers redundant would increase the rate of unemployment. Surprisingly, subjects do not expect monetary policy to have an impact on inflation, although inflation tendencies were explicitly mentioned in the text as a reason for the increase of the interest rate by the central bank.

Concerning the confidence of subjects with respect to their predictions, I find a significantly positive relationship with the size of the predicted effects. The correlation between the average absolute predictions and the average level of confidence over all variables is 0.62 ($p < 0.001$). From a simple bi-variate regression of confidence on the average absolute predictions, I obtain a regression coefficient of 11.05 ($p < 0.001$), meaning that an increase of the average absolute prediction by one point is accompanied by an increase of confidence by 11.05 points on the scale from 0 to 100. Confidence levels are very high for the predictions after the oil pollution and the plant relocation and particularly low in the case of the interest rate increase by the ECB.

4.1. Concreteness vs. abstractness

The individual results in Table 3 already suggest, that concreteness is likely to be important. Table 4 contains the averages over the sums of predictions for each variable for the four different classes of events. Taken together, all predicted effects of the concrete events in classes MC and NC are clearly different from zero. In the MA class, the average predictions are not different from zero, which is a consequence of the predicted positive effects of the euro appreciation. With the exception of the effect on inflation, the events in the NA class are seen to have significant effects, too.

In Table 5, I show the p -values of two-sample mean comparison t -tests with unequal variances on the sums of absolute predictions. Among the economic events, concreteness clearly matters, as the predicted effects on GDP,

Table 6

Absolute mean predictions pooled over all events, 136 observations; asterisks indicate that the mean is significantly different from the mean value in the next column at the 1% error level

	GDP	Sales	U R	I R
$mean(\sum_{i=1}^8 x_i)$	7.83	7.77***	6.65***	5.68
sd err	(0.25)	(0.26)	(0.29)	(0.23)

Table 7

Effects of affective paragraphs on GDP predictions; treatment groups: GDP +: positive cues words, GDP -: negative cue words; p -values of two-sample t -tests on equal means

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Tax	Euro	Ecb	Oil	Agreement	Pollution	Plant	Reform
GDP +	-0.66	0.60	-0.22	-0.80	0.5	-0.79	-1.04	0.07
GDP -	-0.33	0.62	-0.55	-0.87	0.24	-1.10	-0.83	0.33
p	0.085	0.469	0.067	0.376	0.074	0.063	0.177	0.068

unemployment, sales are significantly larger in the MC class than in the MA class. For the non-economic events, this result is even stronger. The null hypotheses (H1) and (H2) are clearly rejected. With respect to the question whether subjects distinguish irrelevant from relevant events, I find that they predict larger effects of relevant events on GDP, inflation, and sales, but not on unemployment, if the events are abstract. If the events are concrete, this is only the case for the predicted effects on inflation and sales, but not for the effects on GDP and unemployment. There is thus no strong evidence that subjects regard the non-economic events as less relevant for the economy than the macroeconomic events.

In column (5), I make a diagonal comparison and vary both dimensions of the event characteristics. It turns out that for three out of the four variables, I cannot reject the hypothesis that the predictions after concrete, but non-economic events are larger than those after abstract economic events. This result provides some indication that concreteness matters even more than macroeconomic relevance. A simple OLS regression of the average absolute prediction pooled over all variables on the average number of associations (see Table 2) and a dummy that is one if the event is relevant and zero otherwise confirms this result. Both coefficients in this regression are significantly positive, but the beta coefficient of concreteness ($\beta_C=0.71$, $p<0.001$) is larger than that of macroeconomic relevance ($\beta_M=0.42$, $p=0.013$, adj. $R^2=0.37$).

A comparison of the average levels of confidence in the four classes shows that concreteness also has an impact on confidence. If the events are economically relevant, confidence in the MC class is significantly higher for the unemployment ($p=0.023$) and sales ($p<0.0001$) than for the MA events. For the rate of inflation, confidence is higher after the abstract events ($p=0.033$). Concrete non-economic events make subjects more confident in the case of GDP ($p=0.036$), unemployment ($p<0.0001$) and sales, but the last difference misses the 10-percent level of significance slightly. Again, the result is reversed for inflation, but here, the difference is not statistically significant either.

Potentially, concreteness also matters with respect to the variables. GDP and the rate of inflation are comparatively abstract concepts, while sales and the unemployment rate are quite concrete. This might explain why we do not find strong effects of concreteness on the confidence in the inflation predictions. However, comparing the mean sums of absolute predictions (see Table 6), I find that in total the largest effects were predicted for GDP and sales (with no statistical significant difference between the two means) and that the mean prediction for the unemployment rate is significantly lower than for sales. As expected the predicted effects on the rate of inflation are lowest. Two reasons might explain the large predicted changes of GDP. First, GDP was in the top position of the table, in which the predictions had to be filled in, which might have created some bias. Second, the concept of GDP and its components had been discussed in great detail in class just two weeks before the experiment.

4.2. Affects

There is no compelling evidence that induced affects significantly influenced the predictions and the associated levels of confidence. Table 7 presents the average predictions of the effects on GDP for the two treatment groups. In three cases (Ecb, Agreement, and Pollution), the predictions in the group with negative affective cues (GDP -) are more negative than in the group with positive cues (GDP +). In three other cases (euro, oil, and plant), there are no significant differences between the groups, and in the remaining cases (tax and reform), the difference between the groups has the wrong sign.

The t -tests do not reject the equality of mean predictions across groups for all other variables. Furthermore, there is not a single significant difference between the three groups for the mean levels of confidence. In other words, the affective paragraphs had no measurable effect on confidence and, if at all, a very small effect on the predictions.

4.3. Discussion

The experiment has produced several fairly strong results. A very basic one is that subjects showed a clear overestimation of the effects of events that do not matter for short-run economic dynamics from the perspective of economic theory. In the case of the plant relocation and the oil pollution, subjects fail to recognize that, while those events clearly would have regional repercussions, they are simply too small to affect the national economy. Subjects' main error is to neglect magnitudes. A major difference between the economic thinking of experts and that of lay people seems to be that non-experts do not separate events as irrelevant and relevant in the same way as experts do.

Another important difference could be that naive subjects use the simulation heuristic as a special case of the availability heuristic to produce economic predictions. The presented findings support the use of the simulation heuristics for two reasons. First, subjects make large predictions with high confidence, if there is an obvious connection between the event and the target variables, such as the effect of the tax increase on sales or of the plant closure on the unemployment rate. These direct channels are much easier to construct than the often indirect mechanisms that are important features of economic models. Second, there is strong evidence for the importance of concreteness or imaginability of events on the strength of the predicted economic effects. Events that are easy to imagine seem to activate associative networks invoking schemas, which makes the mental simulation of an economic process easier. A similar argument can be made for the imaginability of variables. The predictions for more abstract variables like inflation are smaller than for more concrete variables such as sales. It is probably easier for lay people to construct some scenario, in which sales are changed than one with an influence on inflation.

The experiment provides no evidence that subjects use the affect heuristic. With the exception of some effects of the affective cue words on the GDP predictions, no significant differences were found between the three groups of participants.

While the findings concerning affects are somewhat disappointing, they do not necessarily mean that affects do not influence the formation of economic expectations. I do not know whether any affects were induced at all, because I did not measure affects. It might be that the induction of affects by two additional sentences was too weak. Furthermore, it is possible that the alternation of positive and negative paragraphs in each group had offsetting effects on the affective reactions. It might have been possible to induce affective responses if each group had received affective cues only of one type across all events.

The significantly positive predictions after the hypothetical cooperation agreement between the EU and Ukraine, however, can be interpreted as a sign of some emotion-guided expectation formation. Cooperation has a positive valence and news that two parties agreed to cooperate on some field could be assessed as good news. Using the affect heuristic, good news that induce positive affects lead to positive effects.

5. Conclusion

Two questions motivated this study: Which kinds of news do people consider to be relevant for the macroeconomy? Do people react to economically irrelevant affective cues? The evidence presented suggests that lay people's expectations may deviate from expert expectations for two reasons. First, their expectations might be biased since they seem to underestimate economically large events. Second, they possibly believe economically irrelevant events to have macroeconomic effects. This study shows that the participants believed that probably non-economic events influence macroeconomic variables, in some cases even more strongly than economic events. The participants did not recognize that some events are simply too small to have any macroeconomic impact. Especially events that are easy to imagine are expected to have large economic consequences, which supports the hypothesis that non-experts use the availability heuristic to form economic expectations.

An influence of affective cue words on the predictions was not found in this experiment. There were no significant differences between the control group and the groups with additional paragraphs with positively or negatively valenced words. Either the induced effects had no influence on subjects' predictions or the induction of affects was not successful.

What do these results mean? I interpret my findings as supportive evidence for what many business economists outside academia and some academic economists believe: there exist events with little direct impact on the economy but which may have severe mid-term consequences via their impact on consumer or business confidence. On July 7, 2005, the day of the terrorist attacks in London, Kenneth Rogoff and several chief economists of large banks expected

the attack to shaken consumer confidence despite its minor direct impact on the U.K. economy (see Fraher, 2005). I find that other events with possibly even less direct economic impact than a terrorist attack may also affect consumer expectations provided that they are easy to imagine. It may be a bit of a stretch to claim that single salient events can drive an economy with strong fundamentals into a recession. However, they may be able to tilt a stagnating economy into a recession, especially if uncertainty is high and consumers are already concerned. It is important to mention that a theoretical distinction between relevant and irrelevant events is wrong, if consumers believe that events are relevant and behave according to these beliefs. If some kinds of events are repeatedly shown to affect consumers' expectations and behavior, these events are economically relevant and should be treated as such in economic theory.

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