

# THE ECONOMIC IMPACT OF RECESSION ANNOUNCEMENTS

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## Abstract

The convention in the news media is to announce a recession if a country experiences two consecutive quarters of negative growth. We exploit the arbitrary threshold implied by this practice to identify the economic impact of recession announcements through a Regression Discontinuity Design (RDD). Estimation results show that news of a recession leads to a discontinuous fall in consumer confidence, consumption growth and final estimates of GDP growth in a panel of countries. The effect is large, robust and statistically significant.

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# 1. Introduction

Is the macroeconomy suggestible? That is, can a positive or negative message about the economy affect economic outcomes, independent of actual fundamentals? Keynes (1936)'s invocation of "animal spirits" would suggest so, as would more recent macroeconomic models with multiple equilibria (Howitt and McAfee, 1992; Farmer and Guo, 1994; Benhabib and Farmer, 1999; Farmer, 1999). More straightforwardly, positive or negative information about the economy could have effects if agents observe economic fundamentals imperfectly and change their decisions based on the information they receive. A number of empirical studies have attempted to measure the effect of news media on economic outcomes, but the challenges of credibly measuring these effects are substantial.<sup>1</sup> We cannot run an experiment in which we randomly vary the media messages to which whole economies are exposed, and in empirical data it is difficult to identify comparable contexts in which media messages vary.

We focus on a natural experiment that gives us leverage to assess the effect of economic reporting on economic outcomes. We start from the observation that news media pay considerable attention to a binary distinction between being in recession and not being in recession: by a convention observed in almost every industrialized country, a recession is announced when an economy contracts for two consecutive quarters.<sup>2</sup> In cases where growth is almost indistinguishable from zero, the distinction between being in recession and not being in recession becomes highly arbitrary. Nevertheless (as we confirm below), the media treat fundamentally comparable situations quite differently, producing headlines announcing a recession if growth is barely negative for two consecutive quarters but not if growth is even slightly positive. This discontinuous relationship between recession announcements and underlying economic fundamentals offers an unusual opportunity to study the effect of the news media using a regression discontinuity design (Thistlethwaite and Campbell, 1960; Hahn, Todd and Van der Klaauw, 2001; Imbens and Lemieux, 2008). We find that the announcement of a recession reduces both consumer confidence and private consumption growth, with the latter falling by as much as 1 percentage point within the quarter that the recession is announced.<sup>3</sup>

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<sup>1</sup>See references in the next section.

<sup>2</sup>Sims (2003) (at 686-7) provides a rationale for such coarse codings of macroeconomic information and notes that the media is likely to propagate "coding errors" in its attempt to efficiently summarize macroeconomic data.

<sup>3</sup>That is, we find lower consumer confidence and private consumption growth in quarter  $t$  when growth

These findings speak most clearly to the question of how the news media affects the economy, but they also relate to the role of information frictions in understanding macroeconomic outcomes and the transmission of economic shocks. In recent years, macroeconomists have shown how models incorporating noisy, costly, or delayed information can provide novel accounts of core phenomena such as unemployment, the Phillips curve, and aggregate volatility over the business cycle (e.g. [Akerlof, 2002](#); [Mankiw and Reis, 2002](#); [Sims, 2003](#); [Veldkamp, 2011](#); [De Grauwe, 2011](#); [Maćkowiak and Wiederholt, 2015](#); [Angeletos, Collard and Dellas, 2018](#); [Kozłowski, Veldkamp and Venkateswaran, 2020](#)). As these approaches gain recognition and traction, it is increasingly important to know which information frictions macroeconomists should incorporate in their models ([Coibion and Gorodnichenko, 2012](#)). We contribute to this literature by providing evidence that consumers do not pay full attention to easily available information about economic fundamentals.

Although a pure “sunspots” interpretation of our findings may be possible (in which the announcement of a recession reduces confidence and spending simply because agents believe that others will reduce their confidence and spending), it seems likely that the announcement of a recession affects outcomes through an information channel: for agents who are unaware of the quarterly growth rates that determine whether the economy is in recession or not, narrowly being in recession and narrowly not being in recession may appear to be very different states of the world. We highlight episodes where we *know* that differences in fundamentals cannot explain deviations in outcomes following different announcements, but these information frictions are also likely to have implications in a much broader set of circumstances, including those in which media announcements actually do contain news about economic fundamentals such as in [Beaudry and Portier \(2014\)](#). Previous work has suggested that the inattention of economic agents may help explain the smoothness of consumption in the face of economic shocks (e.g. [Reis, 2006](#)). Our findings point toward an elaboration of this view in which the media occasionally offers highly salient public messages that cause coordinated updating of information; information frictions may have the effect of concentrating volatility around these public messages.<sup>4</sup>

Our work is related to several strands of research investigating the role of information in

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is negative in  $t - 2$  and marginally negative in  $t - 1$  (leading to a recession being announced in  $t$ ) than when growth is negative in quarter  $t - 2$  and marginally positive in  $t - 1$  (when no recession is announced in  $t$ ).

<sup>4</sup>[Hansen, McMahon and Tong \(2019\)](#) show that communication by central banks can similarly shape perceptions of long-run uncertainty.

the macroeconomy. [Oh and Waldman \(1990\)](#), [Oh and Waldman \(2005\)](#), and [Rodríguez Mora and Schulstad \(2007\)](#) exploit revisions to macroeconomic statistics to show that forecasting errors have effects on the real economy, with more positive forecasts spurring greater economic activity. Those empirical findings fit with the view that business cycles can be driven by news about future productivity ([Beaudry and Portier, 2014](#)): positive news causes a boom, but a bust takes place if that optimism turns out to be unfounded. Like both these strands of the literature, our results point towards the role of expectations in affecting macroeconomic outcomes. However, our results depart from both in relying on incomplete information processing by economic agents (“sunspot” interpretations aside). Conditional on the economy experiencing what is essentially zero growth, the announcement of a recession will only affect the expectations of agents if they are unaware of recent growth rates. In that sense, our work is complementary to research showing that investors react to “stale news” ([Tetlock, 2011](#); [Gilbert et al., 2012](#)), and that consumers respond to coarsened ratings even conditional on the underlying measures used to generate those ratings ([Figlio and Lucas, 2004](#); [Pope et al., 2009](#)). Our analysis suggests that similar behavioral effects are detectable and important at the aggregate macroeconomic level.

## 2. Media effects in the economy

We are interested in understanding how economic outcomes depend on what messages news media choose to provide about a given set of economic facts. Why should we expect media messages to affect the real economy? A straightforward answer is that economic agents receive a large proportion of their information about the economy from the media ([Blinder and Krueger, 2004](#)), so what the media says naturally shapes perceptions and, in turn, behavior. Because economic agents get their information from the news media and not from official statistical reports, we would expect economic perceptions to depend on whether the news media say the economy is in a recession or not, even if the official statistical reports were essentially the same in the two situations. To the extent that news affects people’s perceptions of their own economic prospects, we may in turn expect it to affect their economic behavior through changes in perceived permanent income or liquidity constraints ([Attanasio and Weber, 2010](#); [Carroll, 1992, 1997](#); [Carroll and Samwick, 1998](#)).

Another way in which media messages might affect the real economy is through co-

ordinating expectations: at least part of the effect of a media report of a recession may operate through agents’ understanding that others are receiving the same information and also changing their behavior. Thus wide-reaching reports may act as a self-fulfilling prophesy by coordinating expectations (e.g. [Azariadis, 1981](#); [Howitt and McAfee, 1992](#); [Farmer and Guo, 1994](#); [Benhabib and Farmer, 1999](#); [Farmer, 1999](#)).<sup>5</sup> At an extreme, media announcements may affect economic behavior as “sunspots”, even if they are commonly understood to convey no information about actual economic fundamentals ([Duffy and Fisher, 2005](#)).

Numerous studies have attempted to measure the economic effects of media reports. [Doms and Morin \(2004\)](#) measure the number of times “recession” is mentioned in news archives and show that their recession index predicts consumer sentiment, controlling for contemporary economic conditions. Several studies in political science similarly measure the mood of news coverage over a given period and look at the extent to which the nature of news coverage predicts voters’ assessments of the economy and ultimately their support for incumbent politicians (e.g. [MacKuen, Erikson and Stimson, 1992](#); [Blood and Phillips, 1995](#); [Nadeau et al., 1999](#); [De Boef and Kellstedt, 2004](#); [Soroka, 2006](#)). [Starr \(2012\)](#) finds that the degree to which consumers report having heard unfavorable news (controlling for actual economic conditions) predicts aggregate measures of sentiment, spending, and unemployment. While all of these studies offer suggestive evidence of a role for media in shaping perceptions and behavior, it is difficult to rule out the possibility that the models they employ suffer from omitted variable bias: perhaps these models find an independent effect of media because the media is reporting important features of economic reality that have been improperly omitted from the set of control variables.

### 3. A Regression Discontinuity Design

Our investigation exploits the role of the media in providing coarsened summaries of economic statistics ([Sims, 2003](#); [Nimark, 2014](#)). In choosing how to report newly-released information on topics such as unemployment, growth or inflation, editorial staff must decide whether to convert continuous economic information into discrete outputs. Should we report the official statistic? Should we call it “reassuring” or “worrying”? In most cases these choices are

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<sup>5</sup>These models typically feature strong strategic complementarities (e.g. consumers rationally spend less when other consumers are spending less) such that agents’ behavior depends strongly on the signals they receive ([Morris and Shin, 2003](#)).

made in idiosyncratic and uncoordinated ways (though sometimes they reflect political bias, as shown by [Larcinese, Puglisi and Snyder \(2011\)](#)), but we focus on a particular context in which almost all media outlets follow the same rule to convert information into a discrete and salient output: the mapping from continuous data on economic growth to the announcement of a recession. According to a widely-followed convention, a recession is defined as occurring when GDP contracts for two consecutive quarters. In situations where growth is almost indistinguishable from zero, we may therefore have occasions when the media announce a recession and occasions when they do not, despite underlying economic conditions essentially being the same. This is the exogenous variation in media messages on which we focus, using a regression discontinuity design.

The convention of equating a recession with two quarters of negative growth can be traced back to Arthur Okun, who reportedly introduced this definition when he was economic adviser to President Lyndon Johnson.<sup>6</sup> Okun’s heuristic was quickly adopted by the global financial press. In 1970 the *Financial Times* referred to it as “the official definition” of recession;<sup>7</sup> by 1980 it was “the classical definition.”<sup>8</sup> In the U.S. the National Bureau of Economic Research (NBER) is now accepted as the arbiter of business cycle dating, but even there the media tend to announce a recession when there are two quarters of negative growth. When the NBER eventually makes a judgment about recessions, it typically aligns closely with the conventional definition. In the rest of the world, two quarters of negative growth has become the standard definition employed by journalists and even government officials, as indicated by our systematic review of business cycle reporting in 17 countries.<sup>9</sup>

A recession is announced under the conventional definition if an economy contracts for two consecutive quarters. Growth figures are only compiled after the quarter has ended,

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<sup>6</sup>Okun reportedly realized that the Council of Economic Advisers could deny that a recession was taking place if it adopted the now-conventional definition of recession, thus protecting President Johnson from criticism for economic mismanagement (Jon Swaine, “[Definition of a recession ‘drawn up on back of an envelope’](#)”, *The Telegraph*, Dec. 23, 2008). See also Edward Cowan, “Recession By Any Other Name Is Still Bad Times”, *The New York Times*, Dec. 24, 1978, pg. 4E, which also credits Okun but quotes him as saying that he developed the two-quarter definition as an “empirical characterization rather than a definition.”

<sup>7</sup>“A U.S. mini-recession”, *Financial Times*, Jan. 21, 1970.

<sup>8</sup>“U.S. economy grows by 1.1%”, *Financial Times*, April 19, 1980, page 2.

<sup>9</sup>For recent examples of government agencies recognizing the two-quarters rule, see (for the U.K.) “[Glossary of Treasury Terms](#)”, HM Treasury 2010 and “[Why does economic growth matter?](#)”, Bank of England KnowledgeBank 2020; (for Finland) [Economic Survey](#), Ministry of Finance 2019; (for Sweden) [Economic Indicators](#), Statistics Sweden 2020; (for Europe) “[European Economic Forecast Summer 2020 \(Interim\)](#)”, European Commission.

so the recession signal  $R_t$  in quarter  $t$  depends on GDP growth rates  $\Delta y_{t-1}$  and  $\Delta y_{t-2}$  in periods  $t - 1$  and  $t - 2$ :

$$R_t = \begin{cases} 1 & \text{if } \Delta y_{t-1} < 0 \text{ and } \Delta y_{t-2} < 0, \\ 0 & \text{otherwise.} \end{cases} \quad (1)$$

The announcement of a recession thus depends on two discontinuities, any combination of which could in principle serve as the basis for a Regression Discontinuity Design. We concentrate the method’s statistical power on recession announcements and non-announcements in the neighborhood of the first discontinuity, i.e., quarters in which growth two quarters ago was negative and growth one quarter ago was close to zero. The running variable is hence  $\Delta y_{t-1}$  and the treatment is  $R_t$ , with the sample restricted to quarters in which  $\Delta y_{t-2} < 0$ . This provides a clean identification of the treatment effect. Since agents are apt to associate a recession announcement with current economic conditions, the more recent the ambiguity the more suggestible they are likely to be.<sup>10</sup>

The effect of announcing a recession is estimated by the average effect of the treatment conditional on  $\Delta y_{t-1} = 0$ . For a given outcome  $Y_t$  it is:

$$\tau = \lim_{\Delta y_{t-1} \uparrow 0} \mathbb{E}[Y_t | \Delta y_{t-1} = 0] - \lim_{\Delta y_{t-1} \downarrow 0} \mathbb{E}[Y_t | \Delta y_{t-1} = 0],$$

which is the average treatment effect at  $\Delta y_{t-1} = 0$ .

## 4. Data

The first announcement of a recession is typically based on preliminary or flash estimates of GDP growth. In measuring the running variable for the Regression Discontinuity Design, it is therefore important to work with the initial, unrevised data. We obtained these by collating real time estimates of GDP growth from multiple sources, and used them to construct the running variables throughout our analysis. Flash estimates contain noise that may lead to erroneous announcement or non-announcement of a recession, which works in our favor by injecting an additional source of randomness into the allocation of quarters to the treatment.

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<sup>10</sup>Our results are qualitatively robust to alternative identifications based on the second discontinuity, or on some combination of the two.

This is especially pertinent when the true growth rate in the previous quarter is close to zero, since then even small amounts of noise may force the preliminary growth rate above or below zero, in which case whether a recession is announced or not becomes largely random.<sup>11</sup> It is an advantage of our regression discontinuity design that a noisy running variable sharpens identification just where it is needed, in the neighborhood of the discontinuity.

The *OECD Revisions Analysis Dataset* provides us with real time monthly estimates of quarterly GDP growth for member and non-member countries from 1999q1 onwards. We use their constant price measure, adjusted for seasonality and the number of working days in the quarter. In general, we take the earliest estimate of  $t - 1$  growth in each country and the best estimate of  $t - 2$  growth that was available at the time. This means we typically use the first preliminary estimate of growth last quarter and the first revised estimate of growth two quarters ago. The last data in our sample is for 2019q2, except for the series for India and Russia which end in 2014q4 and 2016q1 respectively. Preliminary estimates of GDP growth from before 1999 are derived from a variety of references. The most systematic is the *Real-Time Historical Dataset for the OECD*, maintained by the Federal Reserve Bank of Dallas. Where appropriate, we further supplement our data with preliminary GDP estimates published by each country’s relevant authority and (as a last resort) growth rates appearing in *The Economist* magazine’s tables of “Output, Demand, and Jobs”. In each case we prioritize the earliest available data releases and revisions.<sup>12</sup>

Table 1 lists the first quarter of real time data available for each country and the total number of quarters each country is in recession. We also detail the number of quarters that were nearly a recession or nearly not a recession, the former defined by  $\Delta y_{t-2} < 0$  and  $0 \leq \Delta y_{t-1} < 0.5$  and the latter by  $\Delta y_{t-2} < 0$  and  $-0.5 \leq \Delta y_{t-1} < 0$ . Quarters that were nearly a recession or nearly not a recession are what gives our regression discontinuity design statistical power, by identifying the effect of the treatment in the neighborhood of the discontinuity. The economy only narrowly avoids being in recession in the former, whereas it is only narrowly judged to be in recession in the latter.

The real time estimates of GDP growth determine whether or not an economy is in

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<sup>11</sup>In the U.K., a recession was announced in April 2012 based on preliminary GDP estimates that showed slightly negative growth in 2011q4 and 2012q1. Over a year later, the announcement was overturned when revised figures became available. See Julia Kollewe, “UK Sinks Into Double-Dip Recession”, *The Guardian*, 25 April 2012, and Phillip Inman, “UK avoided double-dip recession in 2011, revised official data shows”, *The Guardian*, 27 June 2013.

<sup>12</sup>The construction of our real time dataset is described in Appendix A.



Country	First quarter of data	Number of quarters	Quarters in recession	Quarters nearly not in recession	Quarters nearly in recession
Australia	1984q3	120	3	2	4
Austria	2004q1	61	2	1	1
Belgium	1999q4	78	3	2	5
Brazil	1999q1	73	10	2	4
Canada	1983q2	139	6	2	5
Chile	2010q2	28	0	0	3
Czech Republic	2003q4	60	7	4	1
Denmark	1998q1	77	6	3	7
Estonia	2008q1	38	4	0	0
Finland	1999q4	67	8	3	3
France	1983q4	130	4	2	12
Germany	1991q2	111	14	8	8
Greece	2009q1	30	9	2	5
Hungary	2005q3	53	7	3	0
Iceland	2007q2	43	6	1	0
India	1999q1	50	0	0	0
Indonesia	1999q1	80	1	0	0
Ireland	2005q1	58	6	3	5
Israel	2010q3	36	0	0	0
Italy	1996q4	82	19	11	7
Japan	1983q2	134	17	7	6
Korea	1999q1	75	1	0	2
Luxembourg	2007q2	48	4	1	0
Mexico	2006q4	49	2	0	1
Netherlands	1991q4	108	14	9	6
New Zealand	1999q4	77	4	0	2
Norway	1999q3	72	4	1	6
Poland	2007q1	48	0	0	0
Portugal	2001q1	71	11	4	7
Russia	2011q1	21	4	1	1
Slovakia	2005q4	53	0	0	0
Slovenia	2005q2	53	1	0	4
South Africa	1999q1	76	3	2	5
Spain	1994q1	96	11	6	3
Sweden	2007q1	50	5	2	2
Switzerland	1989q4	104	15	12	8
Turkey	2007q2	48	5	0	1
UK	1990q2	115	10	3	4
USA	1970q3	195	11	4	4
Total		2,907	237	101	132

Table 1: Descriptive statistics by country

recession, but if we are interested in the effect of a recession announcement on the economy then we need to also collect final estimates of GDP growth and other indicators. These are available for each country from the OECD. We match our real time GDP dataset to final data on GDP growth, consumer confidence, business confidence, private consumption, business investment, government spending, and imports.

There is no readily-procurable database that can be used to analyze the response of news media to an economy experiencing two quarters of negative growth. We therefore constructed our own by surveying the media in 14 countries (Australia, Austria, Belgium, Canada, Denmark, France, Germany, Italy, Japan, Mexico, Spain, Switzerland, U.K., U.S.). We instructed research assistants to determine whether a reader of a country’s major newspapers would conclude that the country was definitely or possibly in recession each quarter.<sup>13</sup> The research assistants were instructed to focus on announcements of recession that appeared in headlines and front-page articles. Our survey of news coverage runs from 1990q1 to 2013q2, covering the majority of quarters that were nearly a recession and nearly not a recession in Table 1.

## 5. Assessing validity

The validity of our identification strategy rests on the announcement of a recession being random when growth is close to zero in the previous quarter and negative two quarters ago. This could be undermined if preliminary data releases are systematically manipulated to avoid the government or statistical authority having to announce a recession. If data is being manipulated in this way then that should be reflected in the distribution of preliminary GDP growth rates; we would expect to see biases that lead to the announcement of a recession not being random when growth is close to zero in the previous period and negative two quarters ago. This is something we can test statistically, using multiple approaches. In what follows, we find no statistical evidence that preliminary data releases are systematically manipulated to avoid the economic and political costs of announcing a recession. We conclude that our regression discontinuity design is a valid strategy for identification.

The first approach to detecting manipulation of real time data is based on the local

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<sup>13</sup>The research assistants were native speakers (or nearly so) of the major language of each country they were assigned to.

polynomial density estimator of [Cattaneo, Jansson and Ma \(2020\)](#).<sup>14</sup> If data is being manipulated to avoid the announcement of a recession then the distribution of the running variable (growth in the previous quarter when growth two quarters ago was negative) will be discontinuous at zero. There will be significantly greater probability mass on the positive than the negative side of the discontinuity, as the government or statistical authority manipulates slightly negative preliminary estimates of GDP growth to make them positive and avoid the announcement of a recession. This is investigated in the left panel of [Figure 1](#), which shows the density of the running variable estimated from real time data. There is significant overlap between the 95% confidence intervals on the positive and negative side of zero, and the null hypothesis of no discontinuity is accepted at the p-value of 0.56. The estimates also pass a more powerful test where the null hypothesis of no discontinuity applies not only to the density but also its higher order derivatives (the p-value is 0.86). There is hence no evidence of manipulation in the density estimates.

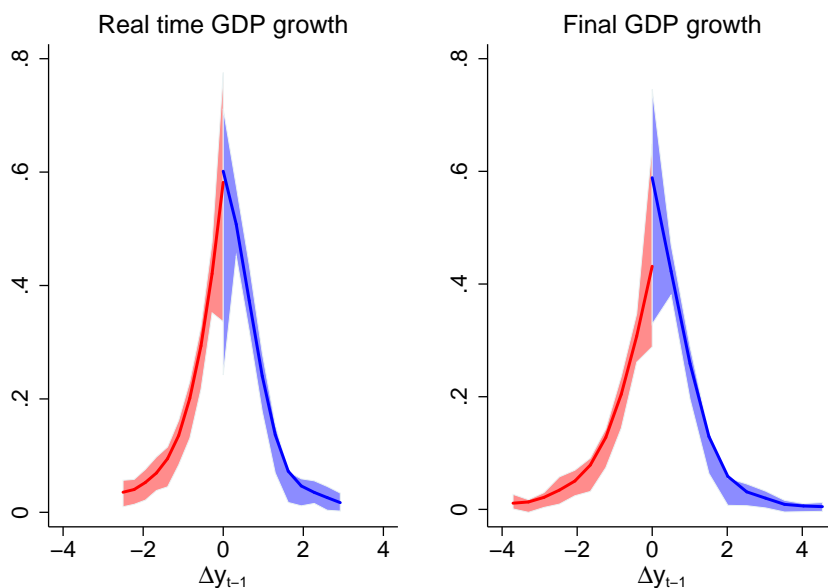


Figure 1: Distribution of running variable defined by real time and final data

NOTE: The running variable  $R_t$  is  $\Delta y_{t-1}$  for all quarters in which  $\Delta y_{t-2} < 0$ . The left panel shows the density of the running variable when it is defined according to real time GDP growth data. The right panel shows the density when it is defined using final GDP growth estimates. Confidence bands are 95%.

<sup>14</sup>[Cattaneo, Titiunik and Vazquez-Bare \(2020\)](#) is a useful survey of the Regression Discontinuity Design literature.

A second check for randomness in the allocation of treatment around the discontinuity is the finite sample exact binomial test of [Cattaneo, Titiunik and Vazquez-Bare \(2017\)](#). In our environment, the idea is that manipulation of real time data would lead to the number of nearly in recession quarters (when the economy was not in recession but growth in the previous period was only marginally positive) being significantly higher than the number of nearly not in recession quarters (when the economy was in recession but growth in the previous period was only marginally negative). The null hypothesis is that quarters in the neighborhood of the discontinuity are allocated to treatment as draws from random Bernoulli trials with probability 0.5, in which case the number of quarters nearly in recession and nearly not in recession should be similar. The left columns of [Table 2](#) show the number of quarters in each category for different windows  $-h < \Delta y_{t-1} < h$  around the discontinuity. There is consistency between the number of quarters nearly in recession and nearly not in recession in all cases. The null hypothesis of equal Bernoulli probability is accepted with p-values in the range 0.32-1.00, suggesting that manipulation is not a problem for identification in our data.

$h$	Real time GDP growth			Final GDP growth		
	Number of nearly in recession quarters	Number of nearly not in recession quarters	p-value	Number of nearly in recession quarters	Number of nearly not in recession quarters	p-value
0.05	10	10	1.00	12	8	0.50
0.10	23	26	0.78	20	20	1.00
0.15	35	36	1.00	31	27	0.69
0.20	43	46	0.83	38	37	1.00
0.25	54	66	0.32	43	49	0.60
0.30	72	77	0.74	49	60	0.34
0.35	80	89	0.54	61	69	0.54
0.40	85	100	0.30	66	78	0.36

Table 2: Binomial tests of no manipulation in allocation to treatment around discontinuity

Our third and final check for manipulation involves comparing the number of recessions announced on the basis of preliminary estimates of GDP growth to those subsequently confirmed by the final estimates. Since the degree of uncertainty around preliminary releases is larger, they may be easier to manipulate and we might expect a lower number of reces-

sion quarters to be announced from preliminary than final estimates. It may also be less economically and politically costly to announce a recession based on final estimates, since those decisions relate more clearly to the past and any news in the announcement has less immediacy. The right panel of Figure 1 shows the local polynomial density estimate when the running variable is calculated according to final rather than preliminary GDP growth. There is less probability mass on the left side of zero in the density estimated from the final estimates. We therefore conclude that preliminary data leads to the identification of more quarters in which a recession is announced, although with a p-value of 0.97 the difference is not statistically significant. If anything, there are too many recessions relative to the final data and there is no basis to claim that the real time data has been manipulated. We note also that the density estimated from the final data passes the test for no discontinuity at zero (with p-value 0.65 for the basic test and 0.39 for the more powerful test), and passes the test for randomness in allocation of treatment around the discontinuity (with p-values in the range 0.34-1.00, see the right columns of Table 2). We deduce that the data appears robustly regular, with no detectable sign of manipulation.

## 6. Results

We estimate the impact of recession announcements using the sharp Regression Discontinuity Design (RDD) methods of [Calonico et al. \(2019\)](#) and [Calonico, Cattaneo and Titiunik \(2014\)](#), which come with optimal bandwidth selectors and robust bias-corrected inference. Of interest is the reaction of news media, consumer and business confidence, and macroeconomic outcomes (growth in consumption, investment, government purchases, imports and GDP) to the release of data indicating two consecutive quarters of negative GDP growth.

### 6.1. Media effects

The RDD estimates for media effects are shown in Figure 2. The left panel plots the probability that our research assistants determined a country was definitely in recession in quarter  $t$ , as a function of the running variable  $\Delta y_{t-1}$  in the sample with  $\Delta y_{t-2} < 0$ . The dots indicate the proportion of observations across countries and time that were definitely judged to be in recession for intervals of the running variable. The lines show linear regressions

on each side of the vertical line at zero. The right panel presents the RDD estimate of the effect on the media of two consecutive quarters of negative growth, measured by the gap in the left panel between local linear regression lines at the zero vertical line. This is  $\tau$  from Section 3, the average effect of the treatment conditional on  $\Delta y_{t-1} = 0$ . The right panel also includes 95% bias-corrected confidence intervals, with the estimate under the optimal bandwidth marked by a black dot and dotted line.

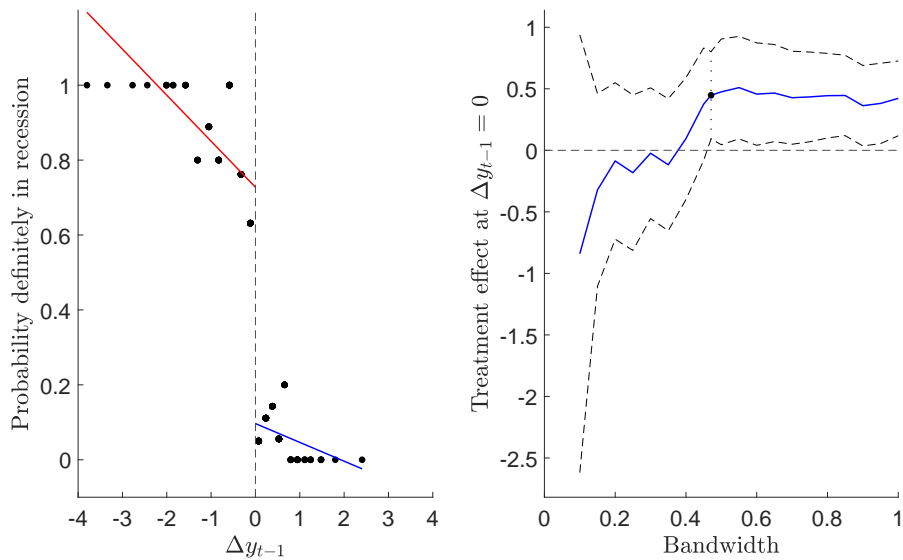


Figure 2: Media effects

NOTE: The left panel is the probability of definitely being in recession reported by our research assistants, plotted as a function of GDP growth  $\Delta y_{t-1}$  in the previous quarter. The right panel is the treatment effect at  $\Delta y_{t-1} = 0$  as a function of the bandwidth of the local linear regressions. The black dot is the estimate at the optimal bandwidth and confidence bands are 95%. The sample is quarters with  $\Delta y_{t-2} < 0$ .

The left panel of Figure 2 indicates that our research assistants almost always gave the answer we would expect when the economy was either deeply in recession or comfortably out of recession. In closer calls there is more ambiguity, but clear evidence remains that news media react strongly to real time data releases that indicate recession according to the conventional definition. There is a 62.5% probability that our research assistants reported a country was definitely in recession when the running variable is immediately to the left of  $\Delta y_{t-1} = 0$ , whereas immediately to the right the probability they make this judgment is only 5.0%. The estimated probability our research assistants would conclude that the country is in

recession jumps by more than 0.5 when the real time estimate of GDP growth in the previous period crosses the arbitrary threshold of zero needed for the announcement of a recession. In the right panel of Figure 2 the discontinuity is significant at the 95% level, confirming that news media do react to preliminary data releases that are almost indistinguishable from zero.

Outcome	Estimates		Bandwidth	N
Definitely in recession	0.504 *** (0.156)	0.645 *** (0.139)	0.471	194
Possibly in recession	0.601 *** (0.119)	0.714 *** (0.132)	0.558	194
Country fixed effects	✓			

Table 3: RDD results for media effects

NOTE: Robust standard errors in parentheses: \*  $0.05 < p \leq 0.1$ , \*\*  $0.01 < p \leq 0.05$ , and \*\*\*  $p \leq 0.01$ .

Table 3 reports RDD estimates of  $\tau$  for the media effect at  $\Delta y_{t-1} = 0$ . The first row shows that the statistically significant treatment effect in Figure 2 is robust to controlling for country fixed effects. Estimates of  $\tau$  barely move and remain highly significant, even when controls are introduced. The second row replicates the analysis using the judgment of our research assistants as to whether the country was possibly in recession, rather than definitely in recession. A similar pattern emerges, with estimates that are large and statistically significant.<sup>15</sup> Across various specifications, we find that news media are very likely to announce a recession after two consecutive quarters of negative growth, even if the negative growth in the previous quarter is almost indistinguishable from zero. A reader of a country’s newspapers would conclude that the country is in recession, irrespective of how marginal was the announcement call.

## 6.2. Confidence effects

Figure 3 shows RDD estimates for the confidence effects of fulfilling the conditions for the announcement of a recession under the conventional definition. Panel A is for an indicator of consumer confidence, which measures the expectations of households with regard to their

<sup>15</sup>As a further robustness check, Appendix B reports additional results in which the local linear regression on each side of the discontinuity is augmented by a quadratic term. In all cases the estimates of  $\tau$  continue to be highly significant.

own situation and general economic conditions over the coming year. Panel B is for a corresponding indicator of business confidence, which summarizes the views of manufacturers about stocks of finished goods, order levels, and production over the next three months.<sup>16</sup>

The RDD plot for consumer confidence indicates a discontinuity at  $\Delta y_{t-1} = 0$ . Crossing the threshold that triggers the news media to announce a recession reduces consumer confidence by an average of almost one percentage point, a reaction that is statistically significant and substantively large. In Table 4 the effect is robust to controlling for country fixed effects. The evidence for a discontinuity in the RDD plot for business confidence is less clear. Whilst the dots and the linear regression lines suggest that crossing the threshold also reduces business confidence, the estimates in Table 4 are less than half those of consumer confidence and the reaction is only significant when controlling for country fixed effects.

Outcome	Estimates		Bandwidth	N
Consumer confidence	-0.993 *** (0.306)	-0.977 *** (0.286)	0.543	424
Business confidence	-0.358 (0.255)	-0.906 *** (0.243)	0.674	464
Country fixed effects	✓			

Table 4: RDD results for confidence

NOTE: Robust standard errors in parentheses: \*  $0.05 < p \leq 0.1$ , \*\*  $0.01 < p \leq 0.05$ , and \*\*\*  $p \leq 0.01$ .

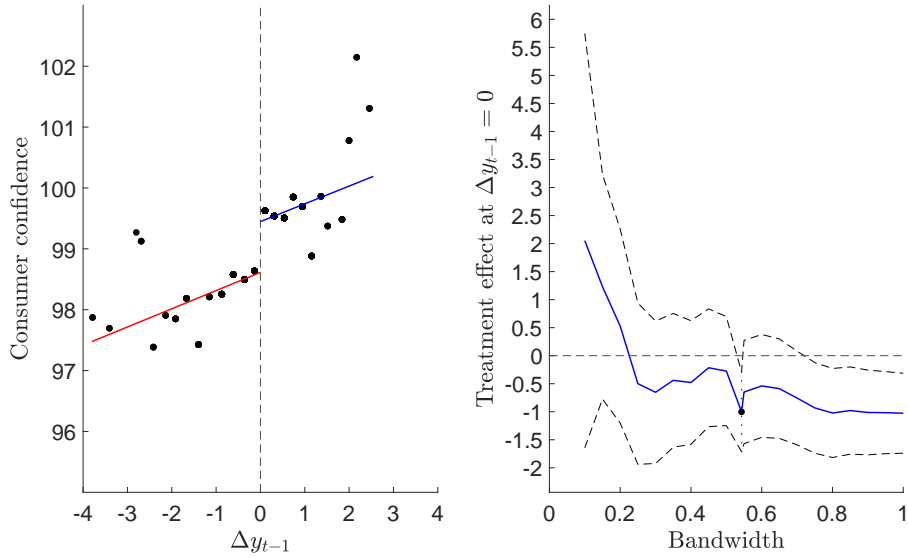
The weaker response of business confidence is somewhat surprising given that, while businesses may not react themselves to news of a recession, they should be aware that consumers do. One possible explanation relating to the older data is provided by [Santero and Westerlund \(1996\)](#), who conclude that “consumer confidence indicators are much less useful than business confidence indicators for economic analysis due to their much looser relationship with output movements.” If that continues to hold then it is less remarkable that business confidence does not react even though consumer confidence does.

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<sup>16</sup>The measures of consumer and business confidence are harmonized by the OECD from initial data compiled by national statistical agencies and private organizations.



### A. Consumer confidence



### B. Business confidence

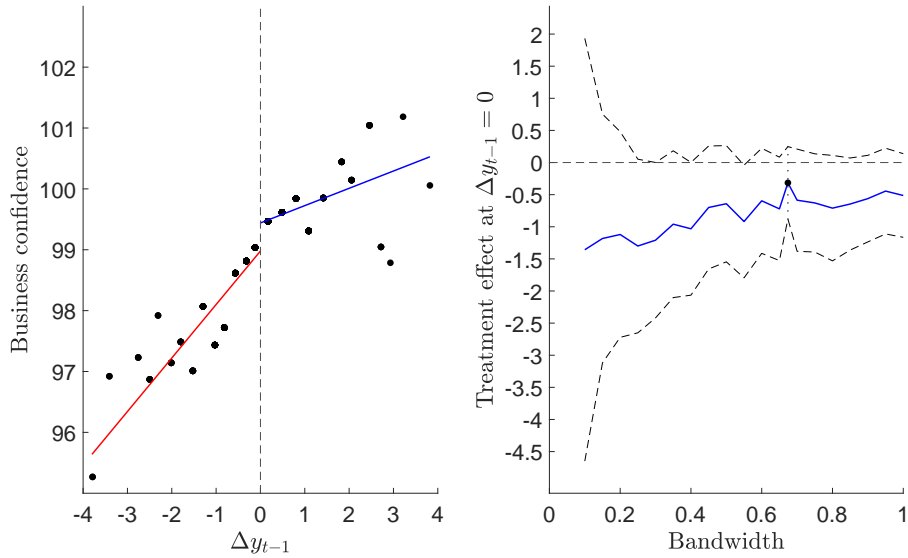


Figure 3: Confidence effects

NOTE: The left panels are consumer and business confidence, plotted as a function of GDP growth  $\Delta y_{t-1}$  in the previous quarter. The right panels are the treatment effect at  $\Delta y_{t-1} = 0$  as a function of the bandwidth of the local linear regressions. The black dot is the estimate at the optimal bandwidth and confidence bands are 95%. The sample is quarters with  $\Delta y_{t-2} < 0$ .

### 6.3. Economic effects

We now turn to assessing whether fulfilling the conditions for the announcement of a recession has a disproportionate effect on the growth rate of the different components of GDP. These economic effects are presented in Figure 4, which mirrors the format of previous figures in plotting final estimates for the growth rate of consumption, investment, government spending and imports as a function of the real time estimate of GDP growth in the previous quarter.<sup>17</sup>

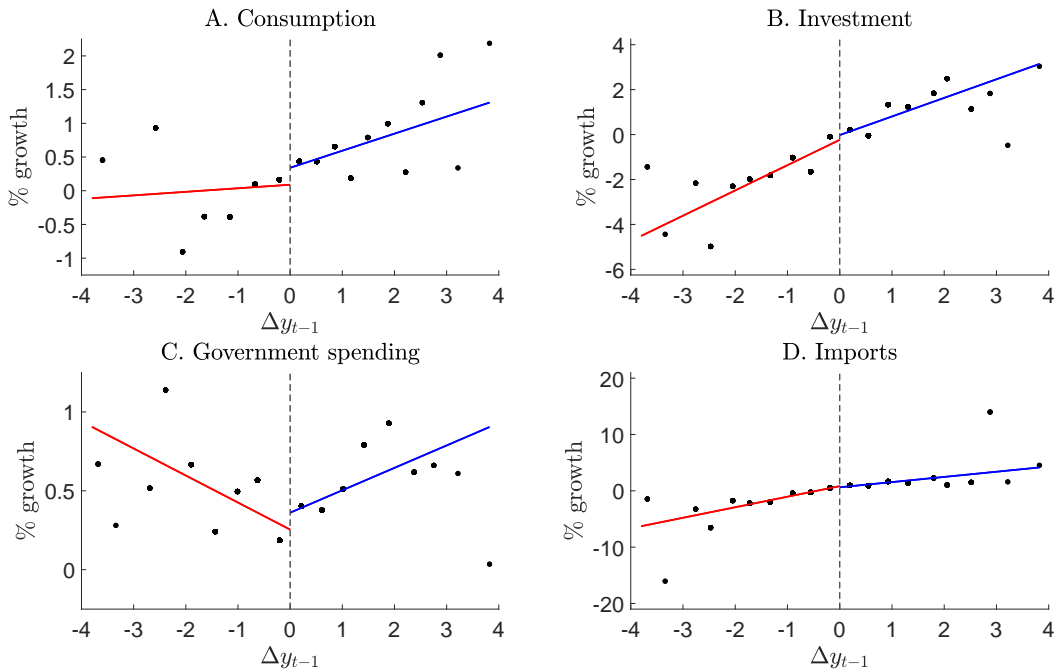


Figure 4: Economic effects on the growth rate of GDP components

NOTE: Each panel shows percentage growth in a component of GDP in the current quarter, plotted as a function of the real time estimate of GDP growth  $\Delta y_{t-1}$  in the previous quarter. The sample is quarters with  $\Delta y_{t-2} < 0$ .

The visual evidence in Panel A of Figure 4 points to a discontinuity in consumption growth at  $\Delta y_{t-1} = 0$ . Immediately to the right of the vertical line at zero it is 0.48%, whereas immediately to the left it is 0.16%. The first row in the RDD estimates for economic effects in Table 5 confirms that the discontinuity is statistically significant at the 10% level, although

<sup>17</sup>The sample is again restricted to quarters for which  $\Delta y_{t-2} < 0$ , so as before  $\Delta y_{t-1} < 0$  is the condition for the announcement of a recession under the conventional definition.

it is not robust to controlling for country fixed effects.<sup>18</sup> We therefore argue that fulfilling the conditions for the announcement of a recession has a disproportionate effect on both consumer confidence and consumer spending. There is a downward jump in consumption growth as the economy crosses the threshold from right to left, from nearly a recession to nearly not a recession.

Outcome	Estimates		Bandwidth	N
Consumption growth	-0.325 *	-0.210	0.426	471
	(0.214)	(0.185)		
Investment growth	0.260	0.107	0.645	471
	(0.686)	(0.616)		
Government spending growth	0.052	-0.199	0.480	471
	(0.263)	(0.285)		
Import growth	-0.619	-0.659	0.456	471
	(0.787)	(0.721)		
Final GDP growth	-0.620 ***	-0.647 ***	0.439	471
	(0.237)	(0.219)		
Country fixed effects	✓			

Table 5: RDD results for economic effects

NOTE: Robust standard errors in parentheses: \*  $0.05 < p \leq 0.1$ , \*\*  $0.01 < p \leq 0.05$ , and \*\*\*  $p \leq 0.01$ .

By contrast, we find no evidence of discontinuities in the remaining panels of Figure 4, where visual inspection suggests that growth in investment, government spending and imports are all continuous at  $\Delta y_{t-1} = 0$ . The hypothesis of no discontinuity is accepted for the remaining components of GDP growth in Table 5.<sup>19</sup> The null result for investment is consistent with businesses facing substantial investment adjustment costs, which make them unwilling to scale down their investment plans immediately in the quarter a recession is announced.<sup>20</sup> The absence of discontinuities in the within-quarter reaction of government spending and import growth is similarly unsurprising, since both are likely to be subject to lagged adjustment.

The RDD estimates for final GDP growth as a whole are in Figure 5 and the last row of Table 5. They exhibit a marked discontinuity at  $\Delta y_{t-1} = 0$ , prompted by the discontinuity in the reaction of consumption growth and the variance-covariance properties of the

<sup>18</sup>The statistical significance is at the 1% level in the local-quadratic estimation results, see Appendix B.

<sup>19</sup>We also find no evidence of discontinuity in the local-quadratic estimates in Appendix B.

<sup>20</sup>There is tentative RDD evidence that recession announcements affect investment growth with a lag of three quarters, consistent with the presence of adjustment costs.

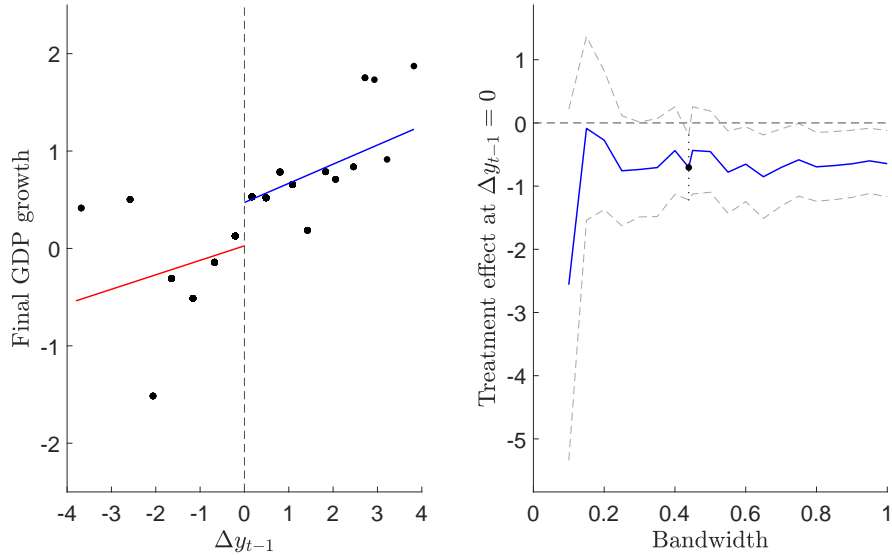


Figure 5: Economic effect on final GDP growth

NOTE: The left panel is final GDP growth  $\Delta y_t$  in the current quarter, plotted as a function of the real time estimate of GDP growth  $\Delta y_{t-1}$  in the previous quarter. The right panel is the treatment effect at  $\Delta y_{t-1} = 0$  as a function of the bandwidth of the local linear regressions. The black dot is the estimate at the optimal bandwidth and confidence bands are 95%. The sample is quarters with  $\Delta y_{t-2} < 0$ .

components of GDP. It is significant at the 1% level in both the linear and locally-quadratic specifications.<sup>21</sup> The results point to the announcement of a recession leading to discrete falls in the growth rates of both consumption and final GDP. The estimated drop in final GDP growth at the threshold is 62 basis points, a magnitude of substantive importance.

#### 6.4. Placebo treatment effects

The credibility of our results is enhanced by falsification tests. We investigate the behavior of consumer confidence, consumption growth and GDP growth at thresholds other than zero, in the expectation that we will only find evidence of a statistically significant discontinuity when the running variable crosses zero. Figure 6 provides corroborating evidence for these placebo treatment effects. In all three cases, it is only at zero that the discontinuity is statistically significant and of the correct sign, i.e., a reduction in the real time estimate

<sup>21</sup>See Appendix B for estimates in the locally-quadratic specification.

of GDP growth in the previous quarter is associated with a downwards jump in consumer confidence, consumption growth or final GDP growth. The point estimate is the most negative at zero for consumer confidence and final GDP growth. For consumption growth it is the 4th most negative at zero.

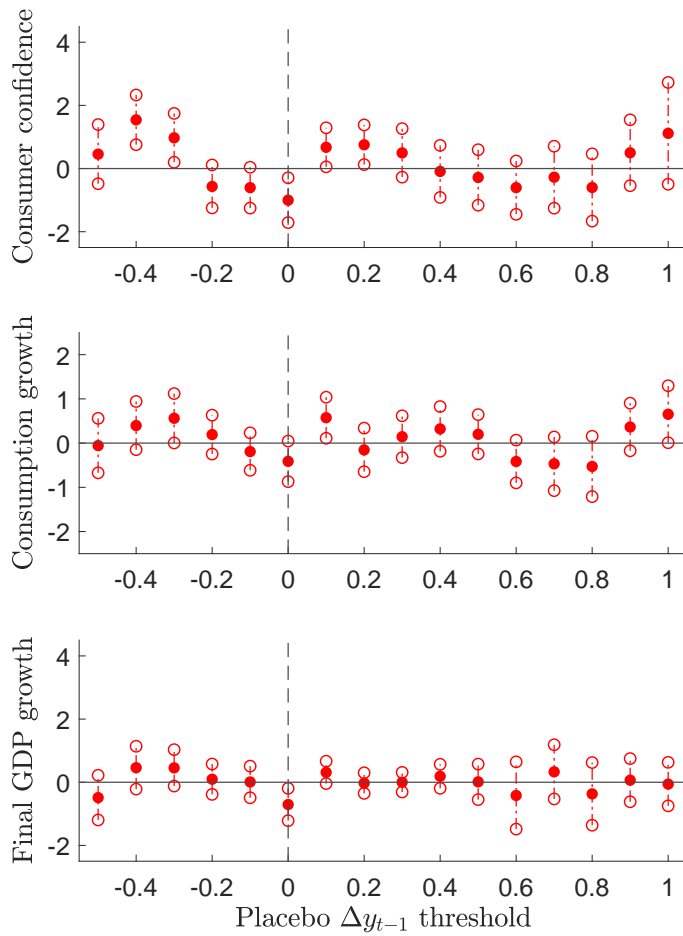


Figure 6: Placebo treatment effects

NOTE: The zero cut off for the announcement of a recession is indicated by a vertical dashed line.

## 7. Conclusion

This paper has exploited the arbitrariness of the conventional definition of a recession to show that the mere announcement of a recession has a significant and meaningful impact on consumer confidence, consumption growth and final estimates of GDP growth in a large set of countries. We found that newspapers report a recession after two consecutive periods of negative growth, and used this feature of business cycle reporting to argue that recession announcements reduce final estimates of GDP growth discontinuously, through a downwards jump in consumer confidence and consumption growth.

Our findings suggest that consumers have sizable information imperfections. This may also have implications for macroeconomic volatility, for example in [Mankiw and Reis \(2010\)](#) where departures from full information lead to muted reactions of consumption that can explain the “excess smoothness puzzle” ([Deaton, 1987](#); [Campbell and Deaton, 1989](#)). In our case, imperfect information intensifies macroeconomic volatility when growth is close to zero: if information is imperfect then news of a recession may trigger a coordinated revision of expectations and a resulting swing in output. This may also be true for other large, attention-grabbing events that could affect economic fundamentals, such as a stock market crash, a political crisis, or a terrorist attack.

Although we are the first to quantify the effects of recession announcements, others have apparently suspected that the R-word has the power to affect the economy. Most famously, U.S. President Jimmy Carter’s advisers once criticized Alfred Kahn, one of his economic advisers, for publicly using the word “recession” in discussing the economic outlook; Kahn responded by promising to replace the word “recession” with “banana” in subsequent press conferences.<sup>22</sup> Our results indicate that the Carter administration’s sensitivity was well-founded, not just because of possible political consequences but also because of real impacts on the economy.

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<sup>22</sup>William Safire, “The Meaning of Depression,” *The New York Times*, April 11, 1982, page 9 of magazine section.

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## A. Real time GDP growth data

The *OECD Revisions Analysis Dataset* contains systematic monthly updates that are as close as possible to real time estimates of GDP growth. The series start in February 1999 for most of our sample countries. To ensure comparability between this data and that which we collected ourselves, we only include observations from earlier periods for which a preliminary estimate of GDP growth in the previous quarter was certainly available within the quarter. Otherwise, we cannot convincingly argue that the media had access to the information in a timely enough manner to report it. Relaxing the restriction to include observations where at least a preliminary estimate of GDP growth two quarters ago was certainly available does not materially affect our results.

The descriptive statistics in Table 1 are constrained by the availability of timely estimates of GDP growth. They also reflect omissions in the recording of seasonally-adjusted data, which means we lose some of the observations for Austria, Czech Republic, Greece, Hungary, Ireland, Iceland, Luxembourg, Mexico, Poland, Russia, Slovakia, Sweden, and Turkey. We cannot use unadjusted data because seasonality injects strong intertemporal dependencies between quarters that dominate any attempt to define whether an economy is in recession or not. For similar reasons, our analysis abstracts from countries with extremely volatile growth rates (Iceland) or many missing or zero growth rates (Estonia, Greece, Luxembourg, Slovakia and Slovenia). The results are robust to their inclusion, at the cost of noisier estimates.

## B. RDD results with local-quadratic estimator

Outcome	Estimates		Bandwidth	N
Definitely in recession	0.442 ** (0.176)	0.485 *** (0.164)	0.790	194
Possibly in recession	0.612 *** (0.166)	0.585 *** (0.159)	0.725	194
Consumer confidence	-0.970 ** (0.394)	-1.102 *** (0.343)	0.853	424
Business confidence	-0.406 (0.332)	-1.332 *** (0.423)	1.104	464
Consumption growth	-0.676 *** (0.254)	-0.375 * (0.224)	0.782	471
Investment growth	-0.198 (0.798)	-0.758 (0.841)	1.019	471
Government spending growth	0.094 (0.337)	0.006 (0.344)	0.679	471
Imports	-0.853 (0.930)	-0.926 (0.873)	0.723	471
Final GDP growth	-0.852 *** (0.334)	-0.639 ** (0.293)	0.653	471
Country fixed effects	✓			

Table 6: RDD results with local-quadratic estimator

NOTE: Robust standard errors in parentheses: \*  $0.05 < p \leq 0.1$ , \*\*  $0.01 < p \leq 0.05$ , and \*\*\*  $p \leq 0.01$ .