

# Ambiguous Economic News and Heterogeneity: What Explains Asymmetric Consumption Responses?

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## Abstract

In this paper we study the asymmetric consumption behavior from an informational perspective. This is to study whether consumers are neutral to the type of news they receive. We test the hypothesis that consumers react more to bad news than to good news using the PSID by analyzing the response of households' consumption to news on aggregate future income. We find that, over the whole sample, the size of consumption responses are larger following negative (bad) news than positive (good) news.

## Key Points

- News about future income is useful in forecasting the change in household consumption even when the growth of household income is controlled.
- Asymmetric consumption response: the response to negative news is much larger than the response to positive news.

## I. Introduction

We disentangle the effects on consumption of

- changes in income ( $D.lny$ )
- changes in non-human wealth ( $D.HousePscaled$ )
- news about future income ( $news$ )

where *changes in income and non-human wealth* are defined by changes in log income and in real house prices over consumption in  $t-1$ , and *news* is characterized by information available to consumers not contained in their own income.

We, then, test if our news variable plays a significant role in explaining consumption decisions and if there is an asymmetric consumption response to news. In particular, given our model specification:

$$\Delta c_{i,t} = \alpha \times D.lny_{i,t} + \beta \times D.HousePscaled_{i,t} + \kappa \times news_t + \phi \times controls_{i,t} + \epsilon_{i,t},$$

we consider the following research questions:

- Does consumers care about information that is not contained in their own income? (Is  $\kappa$  estimated positive and statistically significant?)
  - Yes! Our news variable dated time  $t$ , which provides information of others not available in their own income, is useful even to households who have learned what their time  $t$  income is.
- Does consumption respond differently to positive (good) and negative (bad) news? (Is  $\kappa$  estimated to be different for positive and negative news?)
  - Yes! Consumers react more to bad news than to good news.

## II. Identification strategy

We follow the two-stage econometric procedure:

1. We first extract the news series ( $news_t$ ) using aggregate expenditure data by structurally estimating a simple consumption model
2. We then estimate the effects of news ( $\kappa$ ) on consumption changes, especially by separating its effects for positive and negative news

### Estimating unanticipated news

Our conjecture is that consumers care about something more than their own income when making consumption decisions.

- Based on a permanent income consumption model with imperfect information (Blanchard, L'Huillier, and Lorenzoni 2013) where income process  $a_t$  is sum of two components:

$$\begin{aligned} a_t &= x_t + z_t \\ \Delta x_t &= \rho_x \Delta x_{t-1} + \epsilon_t \\ z_t &= \rho_z z_{t-1} + \eta_t \end{aligned}$$

where  $\epsilon_t$  and  $\eta_t$  are permanent and transitory income shocks.

- Informational restrictions:

1. Agents do not separately observe two income components,  $x$  and  $z$ .
2. Agents receive an additional signal about their permanent income process,  $x$ :

$$s_t = x_t + \nu_t \quad (1)$$

where  $\nu_t$  is a Gaussian noise shock.

We define news as the difference between noisy information and the ex-ante belief about future income:

$$news_t = (s_t - x_{t|a_t})$$

where  $x_{t|a_t} = \mathbb{E}_t[x_t | a_t, s_{t-1}, a_{t-1}, \dots]$ . Whenever  $s_t > x_{t|a_t}$ , we consider that this noisy signal delivers good news and when  $s_t < x_{t|a_t}$ , we call it bad news.

## Estimation and recovering the state variables

Our aim is to structurally estimate the model and obtain the news series ( $s_t - \hat{x}_{t|a_t}$ ). We, the econometricians, do not observe noisy signals ( $s$ ), but instead observe consumption series ( $c$ ) which contains sufficient information about consumers' behavior induced by solving signal extraction problem with noisy signals.

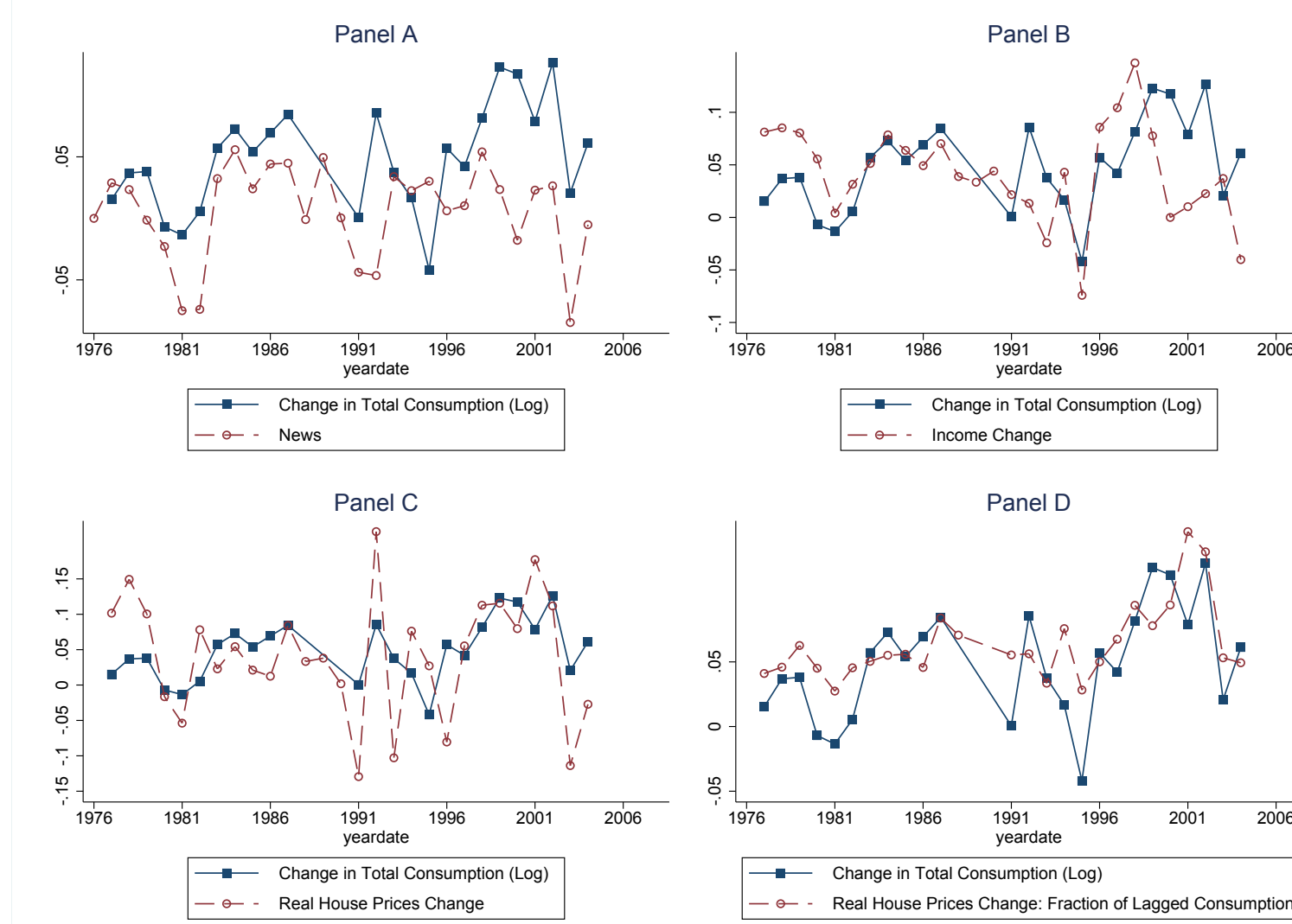


Figure 1: Some stylized facts

Thus, we are able to construct the econometrician's filter and the recover realized news series by smooth-estimating the unobserved states and shocks. For estimating the model, we use labor productivity (real GDP divided by total employment) and consumption expenditure (real consumption expenditure divided by population).

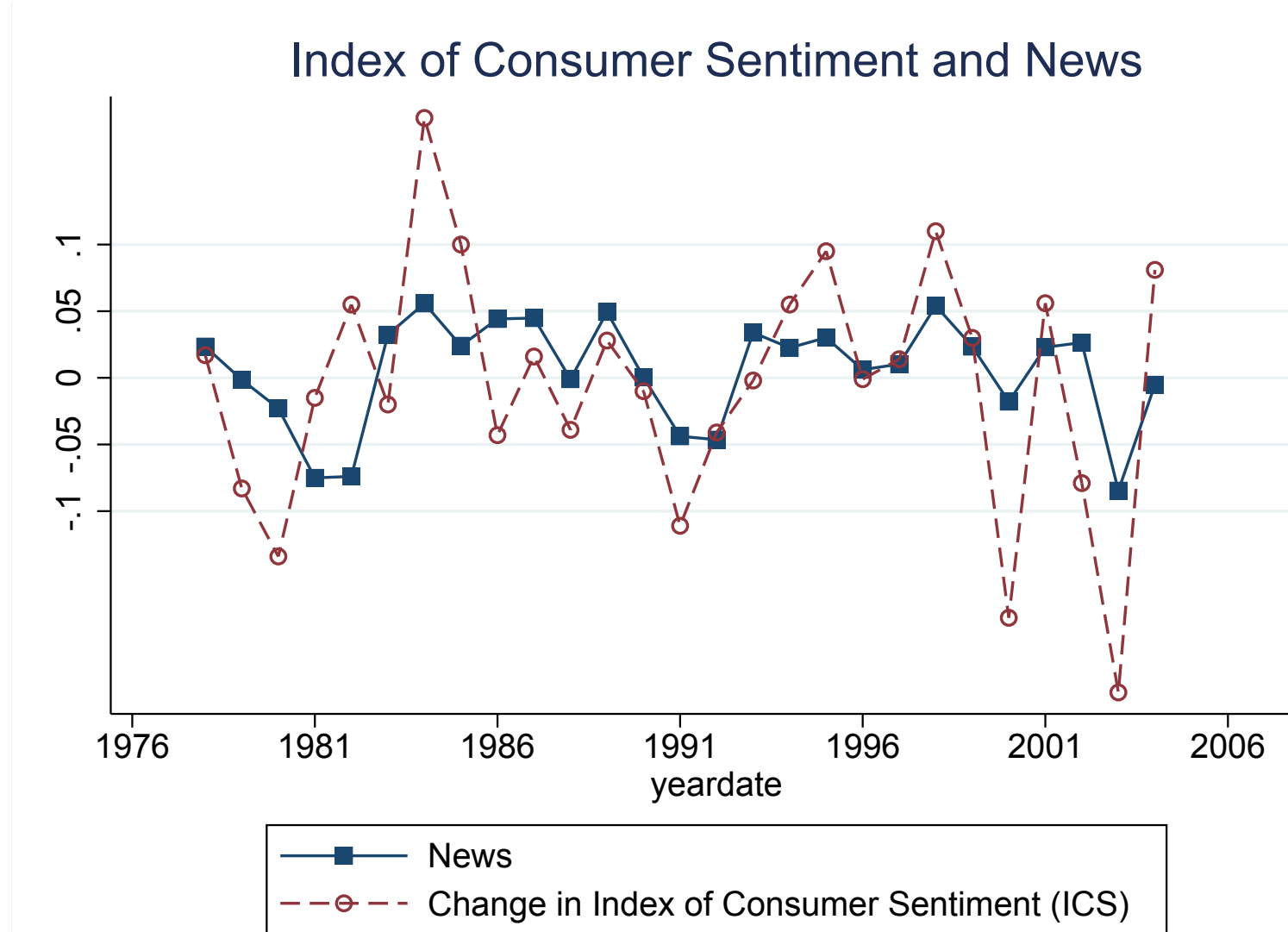


Figure 2: News and the Index of Consumer Sentiment (ICS): 1978-2004

Figure 2 depicts the estimated (annual) news series for the U.S. (blue solid line) and Index of Consumer Sentiment (ICS) (red dotted line) where the ICS is produced by the Survey Research Center of the University of Michigan.

## III. Data and empirical model

For our estimation exercise, we use a panel Fixed Effect estimation with clustered standard errors by household.

We also use panel IV-GMM estimation by instrumenting either  $D.lny$ ,  $D.lny$  and  $D.HousePscaled$  (or  $D.lny > 0$ ,  $D.lny < 0$ ,  $D.HousePscaled > 0$ ,  $D.HousePscaled < 0$  according to the different estimates) with lags from 2 to 28.

The total consumption variable from PSID 1976-2010 is derived from Attanasio and Pistaferri (2014).

## IV. Results

### Violation of the permanent income hypothesis

We first check whether there are violations of the permanent income hypothesis (PIH) due, for example, to liquidity constraints by instrumenting the variable  $D.lny$ , changes in log income. We would instrument  $D.lny$  as it contains information not available to the consumer when the consumer chose the lagged consumption spending. Under the PIH the null is that the effect of expected changes in income is zero, so the coefficient on  $D.lny$  instrumented with information available at time  $t-1$  should be zero. In general the results support the hypothesis of violation of the PIH.

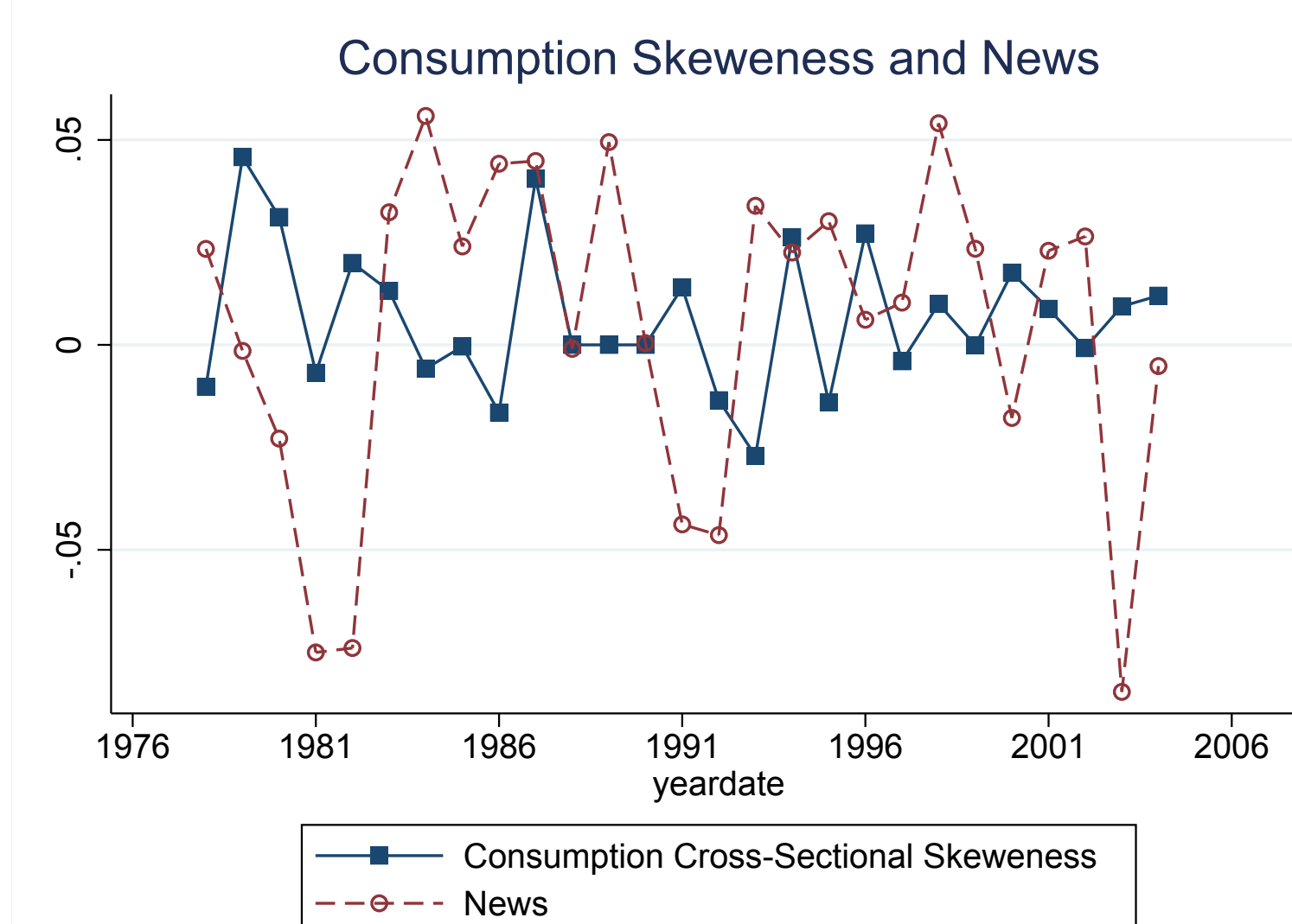


Figure 3: Consumption skewness and news

## Asymmetric consumption responses to news

There is also asymmetric responses to news at time  $t$  such that consumers react more to bad news than to good news. One potential explanation among many others would be aversion to information whose quality is uncertain or ambiguous. In such a case, when they choose consumption they will consider how news affect the future accumulation of human wealth (via news on productivity that affect wages in the Euler) and set their consumption to the lowest attainable level (minmax level). Our intuition relies upon the fact that we don't know if the aggregate fluctuations (our news variable or consumer confidence survey) are rational means consumers probably don't either, so there is uncertainty about what the signals mean.

### Further results

- US households react to positive changes in non-human wealth proxied by the change in real house prices scaled by permanent income (proxied by a fraction of the total consumption in  $t-1$ ). The result holds also after instrumenting for changes in non-human wealth ( $D.HousePscaled$ ).
- They react both to positive and negative changes in income. The result holds also after instrumenting.
- We find heterogeneity in the response of male headed households to positive news (ambiguity loving).

Table 1: Benchmark PSID, 1976-2010

	POLS	Panel FE	Panel IV-GMM
	$\Delta c$	$\Delta c$	$\Delta c$
$news < 0$	0.661*** (0.13)	0.620*** (0.15)	0.666*** (0.14)
$news > 0$	-0.069 (0.18)	0.077 (0.21)	-0.102 (0.19)
$D.lny$	0.295*** (0.00)	0.292*** (0.00)	0.361*** (0.01)
N	31011	31011	31011

Notes: Standard errors in parentheses. Controls include home ownership, gender, race, self-employment, health limitation, age, employment status, marital status, a number of children and state.

Table 2: Adding housing wealth using news and the ICS

	Panel FE	Panel FE
	$\Delta c$	$\Delta c$
$news < 0$	0.475*** (0.15)	-
$news > 0$	0.165 (0.21)	-
$\Delta ICS < 0$	-	0.110** (0.05)
$\Delta ICS > 0$	-	-0.020 (0.02)
$D.lny$	0.253*** (0.00)	0.253*** (0.00)
$D.HousePscaled$	0.011*** (0.00)	0.011*** (0.00)
N	30678	30678

Notes: Standard errors in parentheses. Results similar with POLS and Panel IV-GMM.  $D.lny$  and  $D.HousePscaled$  are instrumented with lags 2 to 28. We do not consider Lag 1 of  $D.lny$  as it is not a valid instrument given that it is correlated with  $D.lny$ .

Table 3: Controlling the signs of income and non-human wealth

	Panel FE
	$\Delta c$
$news < 0$	0.502*** (0.15)
$news > 0$	0.186 (0.20)
$D.lny < 0$	0.253*** (0.01)
$D.lny > 0$	0.263*** (0.01)
$D.HousePscaled < 0$	0.001 (0.00)
$D.HousePscaled > 0$	0.013*** (0.00)
N	30678

Notes: Standard errors in parentheses. Results similar with POLS.

Table 4: News interaction with male

	Panel FE
	$\Delta c$
$news < 0$	0.769** (0.35)
$news > 0$	-0.630 (0.51)
$male*news < 0$	-0.365 (0.38)
$male*news > 0$	0.979* (0.56)
$D.lny$	0.253*** (0.01)
$D.HousePscaled$	0.011*** (0.00)
N	30678

Notes: Standard errors in parentheses. Male headed households seem to be much less uncertainty averse.

## References

- Attanasio, O. and L. Pistaferri (2014). Consumption inequality over the last half century: Some evidence using the new PSID consumption measure. *American Economic Review P&P* 104(5), 122-126.
- Blanchard, O. J., J.-P. L'Huillier, and G. Lorenzoni (2013). News, noise, and fluctuations: An empirical exploration. *American Economic Review* 103(7), 3045-3070.