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## Comment

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### Introduction

In “Whither News Shocks?”, Barsky, Basu, and Lee (2014) are nicely updating and extending the analysis of Barsky and Sims (2011). They identify a technological news shock as the innovation in the expectation of TFP at a fixed horizon  $k$  in the future (typically a few years) that does not affect TFP on impact—that is, the part of  $E_t[TFP_{t+k}] - E_{t-1}[TFP_{t+k}]$  that is orthogonal to the innovation in  $TFP_t$ . The main result that I take from their work is, as they clearly state it, that “the impact effects of news shocks clearly does not induce the kind of comovement that is characteristic of business cycles. In most of our specifications, we find that consumption rises when there is good news, but investment, consumer durables purchases and hours worked all fall on impact.” These results echo those of Barsky and Sims (2011), and contradict those of Beaudry and Portier (2006) and Beaudry and Portier (2014). In this comment, I discuss the properties that a news shock should have in order to capture the short-run effect of a shift in expectations. I show, as already acknowledged by Barsky, Basu, and Lee, that their identified shock moves TFP after one or two periods, and therefore mixes changes in expectation and changes in current fundamentals. I then propose to identify a technological diffusion shock,<sup>1</sup> and show that in that case, I obtain again a Beaudry and Portier (2006) type of response. I conclude that, if one is mainly interested in measuring the response of the economy to a shift in expectation caused by a technological news, it is important to first check that the identified shock does not move TFP in the short run. When it is so, the news creates a typical aggregate boom.

### What an Identified Technological News Can Be?

The basic assumption for the identification of a technological news shock is that it does not affect TFP instantaneously. This is a conservative assumption, as some diffusion processes might have a small instantaneous impact on TFP but medium to long run large one, so that the initial shock is indeed a news of future larger increases, as shown in panel (a) of figure 1.<sup>2</sup> What such an assumption aims at eliminating are shocks that have mainly an impact effect, as the one in panel (b) of figure 1.

Although a zero impact effect is a (conservative) necessary condition to identify a technological news shock, it is not sufficient. Figure 2 displays four possible responses of TFP to such an identified news shock, and that could be obtained with a zero-impact restriction plus some possible extra restrictions. Note that the impact response, materialized by a gray circle, is always zero by assumption. Panel (a) corresponds to a shock that is quickly (after one period) increasing TFP. If such a shock is identified, it is quite impossible to isolate the “pure news” effect from the effect of actual TFP, as made clear by Barsky, Basu, and Lee. Panel (b) shows an identified news that is quite similar in the short run (TFP increases), although the long-run impact is small of null. Panel (c) corresponds to a case where the identified news shock is indeed not a news, as it predicts nothing of the future evolution of TFP. Finally, panel (d) shows a favorable case in which the news is indeed bringing information about the future evolution of TFP without affecting TFP in the short run. I will refer to this case as a technological diffusion news. In this case, it is likely that the impact response of the economy will be driven by the perception of future developments of the technology, and

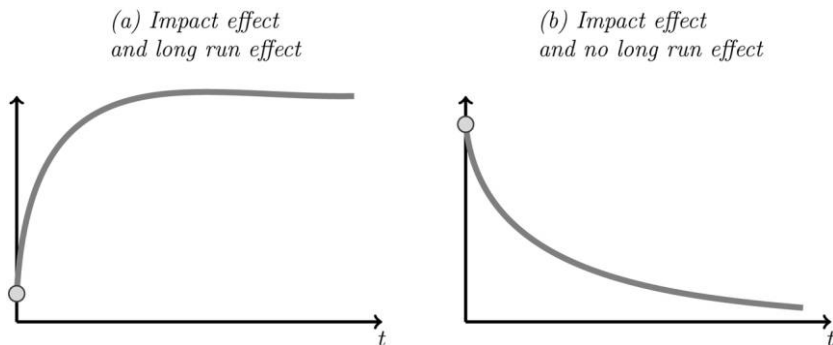


Fig. 1. Possible path for TFP that will not be identified as a “news” shock

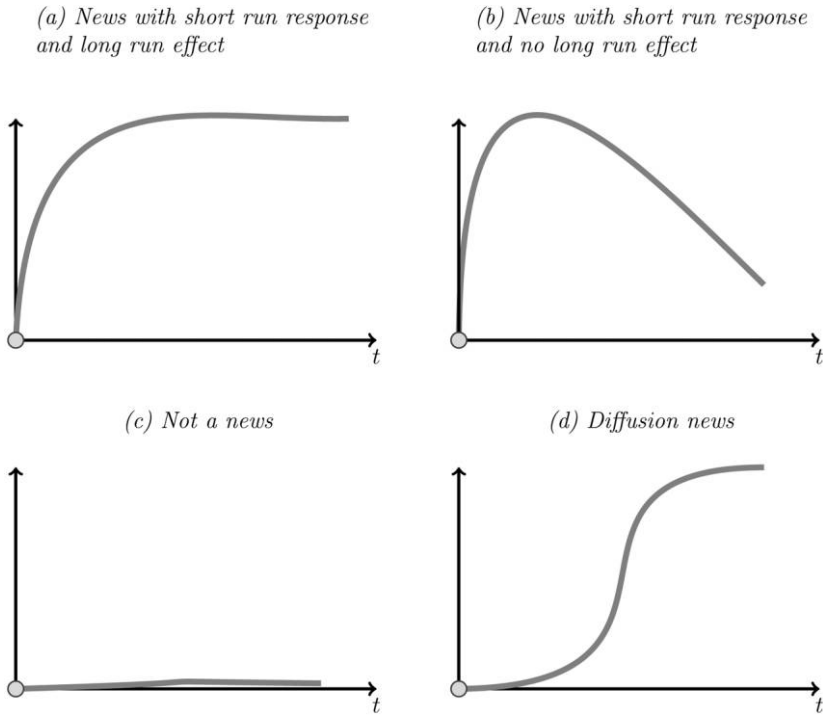


Fig. 2. Possible path for TFP following an identified “news” shock

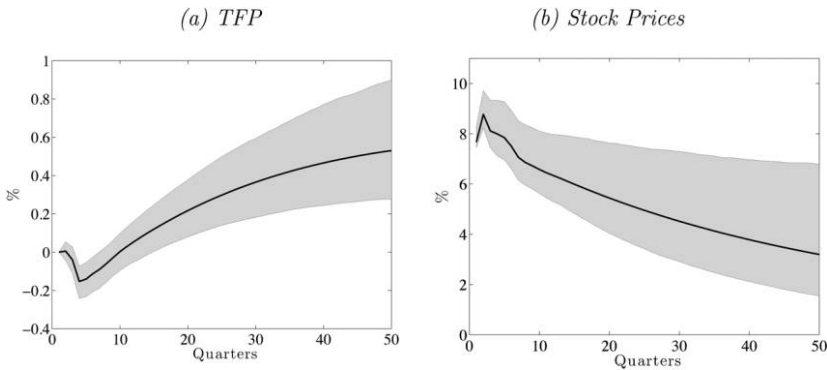
will not be polluted by short-run changes in TFP. Again, there is no presumption that all technological improvements follow such a diffusion pattern, nor that such diffusions explain a lot of productivity, but it is only in that case that one can safely interpret the short-run response of the economy as being driven by a technological news.

**Baseline Results Using Beaudry and Portier’s (2006) and (2014) Identification**

In the following, I will use the same sample and data as Barsky, Basu, and Lee, to which I refer for a complete description. By TFP, I always mean TFP corrected for utilization. All the VARs I will estimate will be in levels with four lags. I will describe the various identification schemes I will consider in terms of restriction on the forecast error variance shares at various horizons.

I first consider the basic Beaudry and Portier (2006) VAR 2. Whereas

the small dimension of the VAR might be a weakness, this VAR has the advantage of being simple and, as we have shown in Beaudry and Portier (2014), gives results that are robust to various extensions. The two variables in the system are TFP and stock prices. The single identifying restriction is that the identified news explains zero percent of the forecast error variance of TFP at horizon one, which corresponds to a Choleski decomposition in which TFP is the first variable and the news shock the first shock. The responses of TFP and stock prices to the identified news shock (Figure 3) show that I do capture a diffusion news. TFP does not increase for about 10 quarters,<sup>3</sup> but does in the long run. As shown in table 1, the news explain virtually no movements of TFP below three years, but half of it in the long run (50 years).<sup>4</sup>



**Fig. 3.** Response to a news shock in the Beaudry and Portier's (2006) VAR 2

Data are those of Barsky, Basu, and Lee (2014) and the sample period in 1960Q1–2012Q2. The news shock is the one that does not affect TFP on impact. The VAR is estimated in levels and with 4 lags. The unit of the vertical axis is percentage deviation from the situation without shock. Grey areas correspond to the 66% confidence band. The distribution of IRF is the Bayesian simulated distribution obtained by Monte-Carlo integration with 2,000 replications, using the approach for just-identified systems discussed in Doan (1992).

**Table 1**

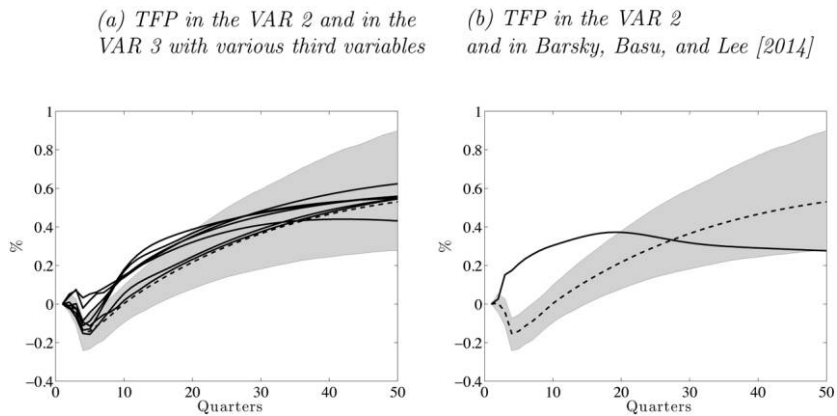
Share of the TFP Forecast Error Variance Explained by the News Shock in the Beaudry and Portier (2006) VAR 2

Horizon (quarters):	1	4	8	12	40	80	200
Share:	0	1	2	1.4	17	38.5	54.3

*Note:* Data are those of Barsky, Basu, and Lee (2014) and the sample period in 1960:Q1–2012:Q2. The news shock is the one that does not affect TFP on impact.

I now extend the analysis by using trivariate VARs to estimate the response of the various macroeconomic aggregates considered by Barsky, Basu, and Lee. To do so, I follow the identification strategy of Beaudry and Portier (2014). I need three restrictions to identify the news shock, a unrestricted technology shock, and a third shock. The news shock and the third shock are constrained to explain zero of the one-step-ahead forecast error variance of TFP. The third shock is also constrained to explain zero of the long-run forecast error variance of TFP. The trivariate VAR contains TFP, stock prices, and a third variable that is alternatively investment, consumption of nondurable and services, hours, consumption of durable goods, confidence, inflation, and the nominal interest rate on three-month Treasury bills. Those seven extra variables are the ones used in Barsky, Basu, and Lee.

I first compare the seven responses that I obtain for TFP with the one obtained in the bivariate VAR. This is shown in panel (a) of figure 4. By



**Fig. 4.** Response of TFP in the VAR 2, in the VAR 3 for various third variables, and in Barsky, Basu, and Lee (2014).

Data are those of Barsky, Basu, and Lee (2014) and the sample period in 1960Q1–2012Q2. In the VAR 2 (the dashed line), the news shock is the one that does not affect TFP on impact. In the various VAR 3 (panel [a]), the news shock is only restricted to have no impact effect on TFP but is not restricted in the long run. In panel (b), the plain lines is Barsky, Basu, and Lee (2014) news shock—that is, the innovation in the expectation of TFP at horizon 20 quarters that does not affect TFP on impact. The VARs are estimated in levels and with 4 lags. The unit of the vertical axis is percentage deviation from the situation without shock. Grey areas correspond to the 66% confidence band of the VAR 2. The distribution of IRF is the Bayesian simulated distribution obtained by Monte-Carlo integration with 2,000 replications, using the approach for just-identified systems discussed in Doan (1992).

**Table 2**

Share of the TFP Forecast Error Variance Explained by the News Shock in the Various Beaudry and Portier (2014) VAR 3

Horizon (quarters)	Share of the TFP Variance						
	1	4	8	12	40	80	200
Third variable:							
Cons. of nondur. and serv.	0	1	1	4	46	67	77
Investment	0	1	1	4	30	48	59
Confidence	0	0	0	2	24	42	55
Hours	0	2	2	2	19	41	53
Cons. of dur.	0	1	1	5	36	53	64
Inflation	0	0	1	2	27	49	64
3-month T-bills	0	1	1	1	18	40	59
Barsky, Basu, and Lee (2014)	0	4	12	20	52	50	31

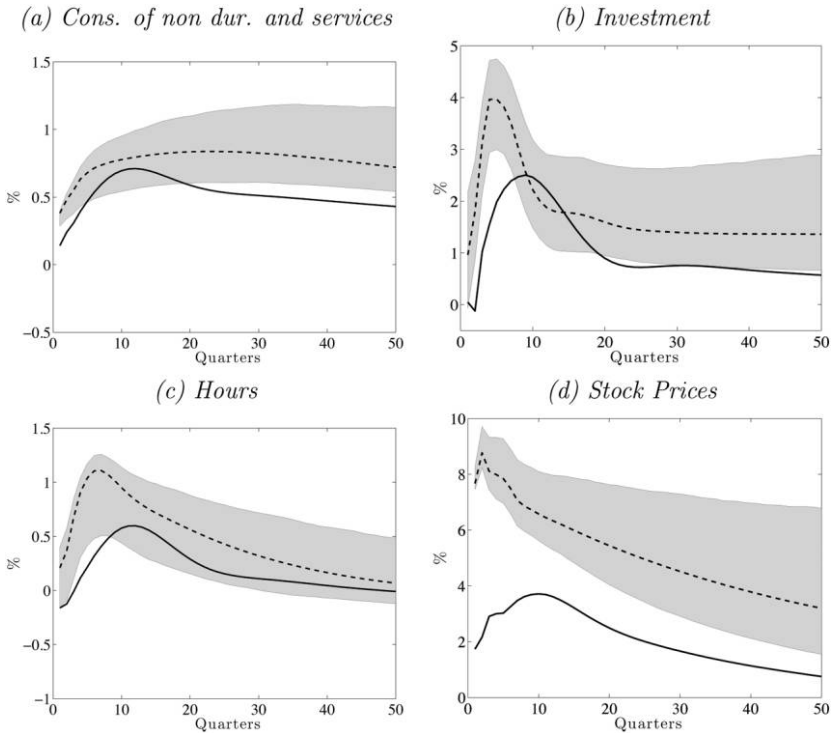
*Note:* Data are those of Barsky, Basu, and Lee (2014) and the sample period in 1960:Q1–2012:Q2. In the various VAR 3, the news shock is only restricted to have no impact effect on TFP but is not restricted in the long run. For Barsky, Basu, Lee, the news shock is the innovation in the expectation of TFP at horizon 20 quarters that does not affect TFP on impact.

and large, I do obtain a diffusion news, as confirmed by the variance decomposition of TFP displayed in table 2.

Now that I am confident that I have identified a diffusion news, I can look at the responses of the various macroeconomic aggregates to that shocks. Those responses are presented in figures 5 and 6. I observe all the characteristics of an economic expansion. Consumption of nondurable goods and service, investment, and hours do increase on impact and subsequently, before any sizable increase in TFP. The news is also a confidence boom, but the confidence increase is met with a later increase in TFP.<sup>5</sup> Only consumption of durable goods does not move on impact, but displays a hump-shaped response after one period. Finally, as in Barsky, Basu, and Lee, inflation and the nominal interest rate fall. The lesson I take from those results is that when a technological diffusion news is identified, it creates an aggregate boom with typical business-cycle comovements of quantities.

### What do Barsky, Basu, and Lee Identify?

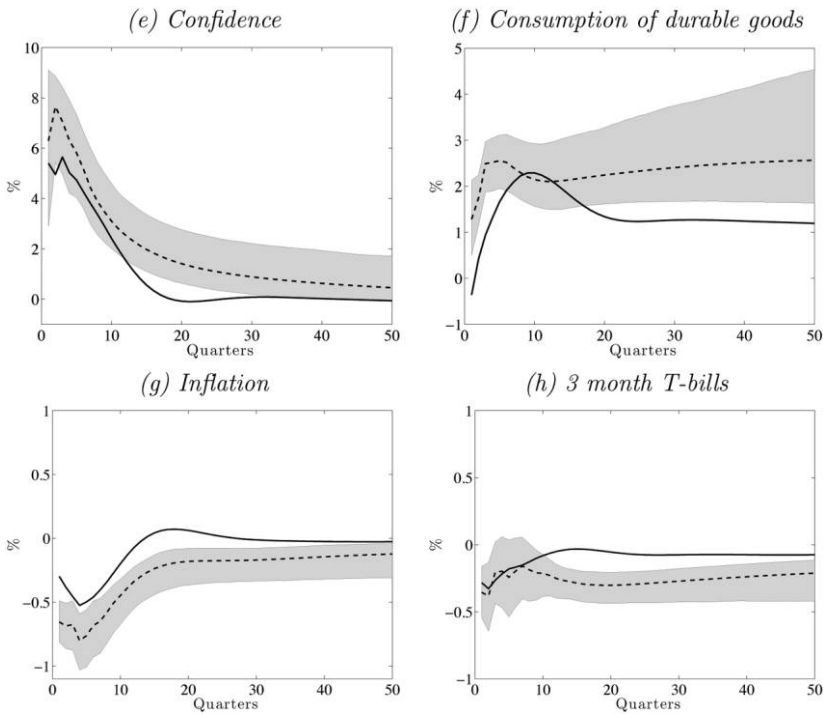
Barsky, Basu, and Lee obtain some different results concerning the impact of a news, namely “Consumption typically rises following good news, but investment, consumer durables purchases, and hours worked typically fall on impact.” As I have obtained results similar to Beaudry



**Fig. 5.** Response of the other eight variables in Barsky, Basu, and Lee (2014) and in the various VAR 3.

Data are those of Barsky, Basu, and Lee (2014) and the sample period in 1960Q1–2012Q2. In the various VARs 3 (the dashed line), the news shock is only restricted to have no impact effect on TFP but is not restricted in the long run. The plain lines is Barsky, Basu, and Lee (2014) news shock, that is, the innovation in the expectation of TFP at horizon 20 quarters that does not affect TFP on impact. The VARs are estimated in levels and with 4 lags. The unit of the vertical axis is percentage deviation from the situation without shock. Grey areas correspond to the 66% confidence band of the VAR 3. The distribution of IRF is the Bayesian simulated distribution obtained by Monte-Carlo integration with 2,000 replications, using the approach for just-identified systems discussed in Doan (1992).

and Portier (2006) with the same data than Barsky, Basu, and Lee, it has to be that the authors identify a different shock. Their identification strategy is simple and appealing: the news shock is identified as the innovation in the expectation of TFP at horizon  $k$  that does not affect TFP on impact. Note that in a bivariate VAR, this corresponds to the identification of Beaudry and Portier (2006), while it does correspond to Beaudry and Portier’s (2014) identification that I use in the VAR 3 presented before when  $k$  goes to infinity.



**Fig. 6.** Response of the other eight variables in Barsky, Basu, and Lee (2014) and in the various VAR 3 (continued).

Data are those of Barsky, Basu, and Lee (2014) and the sample period in 1960Q1–2012Q2. In the various VARs 3 (the dashed line), the news shock is only restricted to have no impact effect on TFP but is not restricted in the long run. The plain lines is Barsky, Basu, and Lee (2014) news shock, that is, the innovation in the expectation of TFP at horizon 20 quarters that does not affect TFP on impact. The VARs are estimated in levels and with 4 lags. The unit of the vertical axis is percentage deviation from the situation without shock. Grey areas correspond to the 66% confidence band of the VAR 3. The distribution of IRF is the Bayesian simulated distribution obtained by Monte-Carlo integration with 2,000 replications, using the approach for just-identified systems discussed in Doan (1992).

The responses obtained by Barsky, Basu, and Lee correspond to the plain line in panel (b) of figure 4 and on figures 5 and 6. Looking at panel (b) of figure 4, it is clear that their shock is not a diffusion news. As expected by the identification strategy, the news shock of Barsky, Basu, and Lee peaks around 20 quarters. As shown in table 2, it explains 20 to 30% of the variance of TFP between three and ten years, and about one-third of the long run. As highlighted by the authors: “however, unlike Beaudry and Portier (2006), we find that TFP begins



rising markedly one or two periods after the news shock." As it can be seen on panel (d) of figure 5, the stock prices jump is about four times smaller on impact.

Given that the technological impulse is quite different, responses of some variables are different: in particular, hours, investment, and consumption (both nondurable and services and durable) react less, and with negative impact response, as opposed to the positive and increasing response to the technological diffusion news. There is of course nothing wrong with Barsky, Basu, and Lee, but it does not identify a diffusion news, which is I think what we are after when we want to evaluate the response of the economy to a shift in expectations.

### Identifying a Technological Diffusion News

In this section, I explore further the identification of a technological diffusion news, using a rather extreme identification scheme. In Beaudry and Portier (2006), it is (surprisingly) the shock that does not affect TFP on impact that explains most of its long run. In order to obtain a diffusion and eliminate short-run changes in TFP that would pollute the identification of a response to a news, I am now restricting TFP not to respond for  $k$  periods.<sup>6</sup>

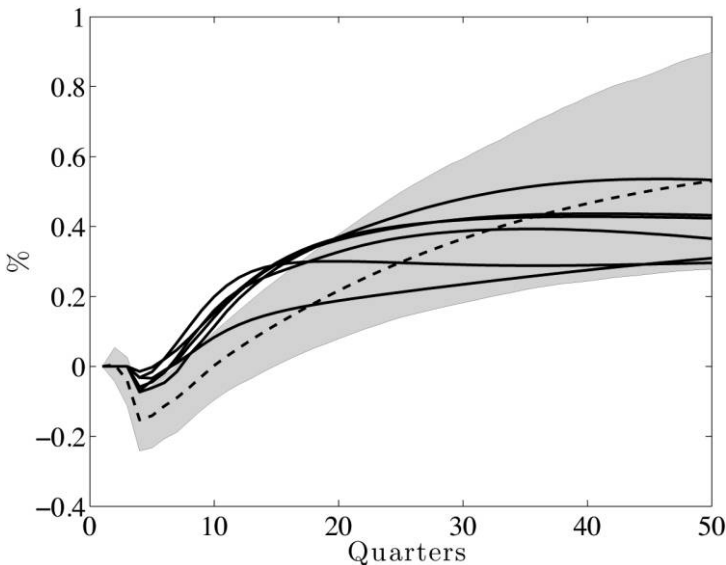
When considering a  $n$ -variable model, I am restricting  $n - 1$  shocks to explain zero percent of TFP one-step-ahead forecast error variance. The  $n$ th shock is an unrestricted technology shock. Out of the  $n - 1$  others, I am restricting one to explain zero percent of TFP forecast error variance not only at horizon one, but also 2, 3, . . . ,  $n - 1$ . One can check that this allows to uniquely define that shock, as I do not need to separate out the  $n - 2$  other ones. I refer to this identification as the ZRs identification (for zeros).

In a model with exogenous TFP, such an assumption would not separate diffusion news from all the other nontechnological shocks. On the other hand, if one thinks that TFP is contaminated in the short run because of mismeasurement in the input intensity use, then the identified shock will catch only noise. Although there is no presumption that such an identification scheme will give any interesting results, it happens that it does.

I estimate four variables VARs<sup>7</sup> that always contain TFP, consumption of nondurables and services, and investment. The fourth variable is one of the six other ones used by Barsky, Basu, and Lee: confidence, stock prices, consumption of disable goods, hours, inflation, and the short-

run nominal interest rate. Effectively, the news shock is constrained not to affect TFP for three quarters, while two other shocks are constrained not to affect TFP in impact and the fourth shock is left unrestricted.

Figure 7 displays the response to TFP in the six VAR 4, together with the response obtained in the VAR 2 of Beaudry and Portier (2006). Indeed, the identified shock is very similar across VAR 4, similar to the VAR 2 one, and different from the ones identified by Barsky, Basu, and Lee. It does capture a technological diffusion news. As shown in table 3, the shock explains virtually nothing of TFP at horizons lower than three years, but does explain more than half of it in the long run (from 57% to 74% depending on the fourth variable). As I am confident that this shock is indeed a technological diffusion news, I can safely evaluate whether or not it creates an aggregate boom that is not caused by a short-run increase in TFP. As shown in figures 8 and 9, hours, investment, and consumption of nondurable goods and services boom with a



**Fig. 7.** Response of TFP in the VAR 2 and in the VAR 4 with the ZRs identification for various fourth variables.

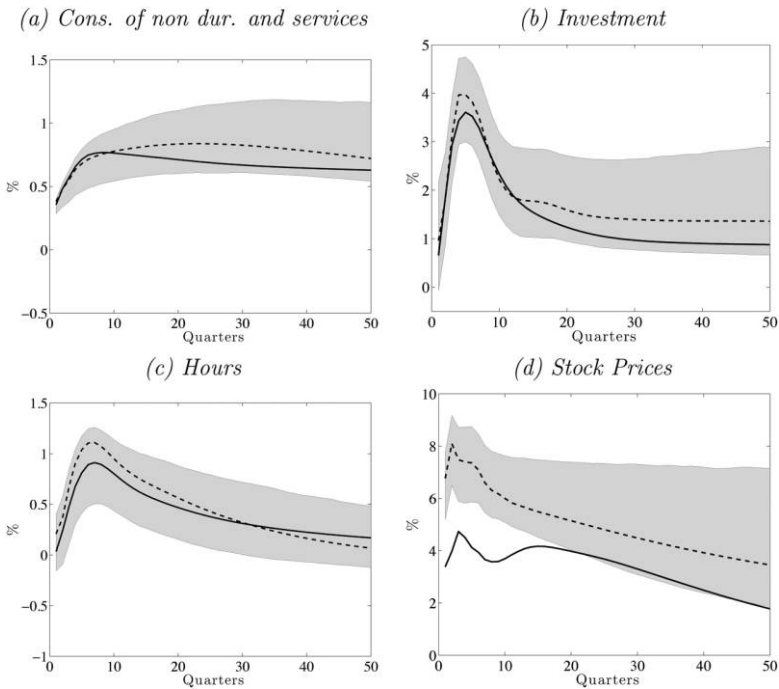
Data are those of Barsky, Basu, and Lee (2014) and the sample period in 1960Q1–2012Q2. In the VAR 2 (the dashed line), the news shock is the one that does not affect TFP on impact. In the various VAR 4 (plain lines), the news shock is the one that does not affect TFP for the first three periods. The VARs are estimated in levels and with 4 lags. The unit of the vertical axis is percentage deviation from the situation without shock. Grey areas correspond to the 66% confidence band of the VAR 2. The distribution of IRF is the Bayesian simulated distribution obtained by Monte-Carlo integration with 2,000 replications, using the approach for just-identified systems discussed in Doan (1992).

**Table 3**

Share of the TFP Forecast Error Variance Explained by the News Shock in the Various VAR 4 with the ZRs identification

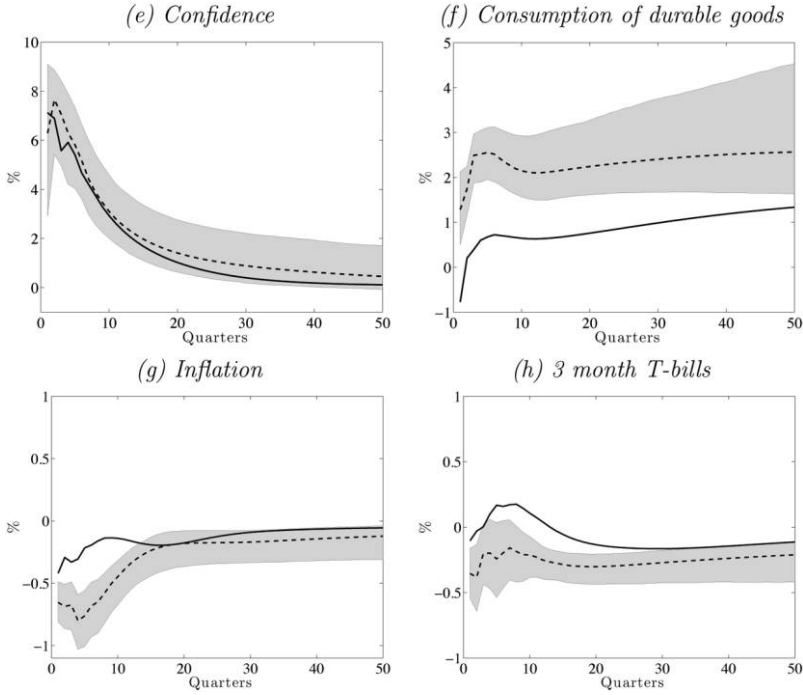
Horizon	1	4	8	12	40	80	200
Fourth variable:							
Stock prices	0	0	0	4	44	59	64
Confidence	0	0	0	1	16	41	57
Hours	0	0	1	6	42	57	65
Cons. of dur.	0	0	0	1	16	41	57
Inflation	0	0	0	2	45	66	74
3-month T-bills	0	0	0	2	45	66	74

Note: Data are those of Barsky, Basu, and Lee (2014) and the sample period in 1960Q1–2012Q2. In the various VAR 4, the news shock is the one that does not affect TFP for the first three periods.



**Fig. 8.** Response of the other eight variables in the VAR 3 and the VAR 4 with ZRs identification.

Data are those of Barsky, Basu, and Lee (2014) and the sample period in 1960Q1–2012Q2. In the VAR 3 (the dashed line), the news shock is the one that does not affect TFP on impact but is not restricted in the long run. In the various VAR 4 (plain lines), the news shock is the one that does not affect TFP for the first three periods. The VARs are estimated in levels and with 4 lags. The unit of the vertical axis is percentage deviation from the situation without shock. Grey areas correspond to the 66% confidence band of the VAR 3. The distribution of IRF is the Bayesian simulated distribution obtained by Monte-Carlo integration with 2,000 replications, using the approach for just-identified systems discussed in Doan (1992).



**Fig. 9.** Response of the other eight variables in the VAR 3 and the VAR 4 with ZRs identification (continued).

Data are those of Barsky, Basu, and Lee (2014) and the sample period in 1960Q1–2012Q2. In the VAR 3 (the dashed line), the news shock is the one that does not affect TFP on impact but is not restricted in the long run. In the various VAR 4 (plain lines), the news shock is the one that does not affect TFP for the first three periods. The VARs are estimated in levels and with 4 lags. The unit of the vertical axis is percentage deviation from the situation without shock. Grey areas correspond to the 66% confidence band of the VAR 3. The distribution of IRF is the Bayesian simulated distribution obtained by Monte-Carlo integration with 2,000 replications, using the approach for just-identified systems discussed in Doan (1992).

hump shape, confidence increases on impact, the nominal interest rate does not move much, and inflation decreases as in Barsky, Basu, and Lee. Overall, I obtain again the pattern of Beaudry and Portier (2006), not the results of Barsky, Basu, and Lee.

## Conclusion

Barsky, Basu, and Lee are proposing a new identification of news shocks. The news shock is the innovation in the expectation of TFP at horizon  $k$

(five years in their baseline exercise) that does not affect TFP on impact. They obtain the following responses for quantities: consumption typically rises following good news, but investment, consumer durables purchases, and hours worked typically fall on impact. Those responses contradict the previous results of Beaudry and Portier (2006). I have shown that what they identify is a shock that indeed moves TFP in the short run, although not on impact. I have proposed two other identification schemes for which the identified shock is a technological diffusion news, meaning TFP is not affected in the short to medium run (say the first three years), but is permanently increased. Results show that following a technological diffusion news, the economy does display an aggregate boom with typical business cycles comovements.

## Endnotes

Toulouse School of Economics and CEPR (Franck.Portier@TSE-fr.eu). This work draws heavily on my joint research with Paul Beaudry. I also thank Patrick Fève for comments. For acknowledgments, sources of research support, and disclosure of the author's material financial relationships, if any, please see <http://nber.org/chapters/c13420.ack>.

1. Comin and Hobbijn (2010) have shown the empirical relevance of diffusion patterns for technological change.

2. In Beaudry and Portier (2014), we more generally define *news-rich* processes. In a univariate setting,  $x_t = \theta_0 \varepsilon_t + \theta_1 \varepsilon_{t-1} + \dots + \theta_k \varepsilon_{t-k} + \dots$  is *news rich* if there exists at least one  $q$  such that  $|\theta_q| > |\theta_0|$ . Such processes are of the news type in the sense that a larger share of the variance of  $x_t$  is attributable to the shock  $\varepsilon_{t-q}$  than to the shock  $\varepsilon_t$ , that is, more variance is due to a shock known  $q$  period in advance than due to the current period surprise.

3. The TFP actually decreases, which might be the consequence of an excessive correction for utilization.

4. The estimation of the long-run TFP forecast error variance explained by the news shock depends on the restrictions made about the number of cointegrating relations in the VAR. In the preferred specification of Beaudry and Portier (2006) with one cointegrating relation, the share is 70% in the long run.

5. Note that one cannot distinguish a story in which the TFP diffusion is the driving force and confidence simply reflects the good news and one in which the initial impulse is an animal spirit-generated boom in confidence that causes an endogenous long-run increase in TFP. The latter story would typically emerge from a model with indeterminacy and learning-by-doing.

6. This is an extreme exercise. A more reasonable identification would be of the type "the technological diffusion news should not explain more than  $x\%$  of the variance of TFP from periods 1 to  $k$ ,"  $x$  being small and  $k$  about two or three years.

7. In the slides of my discussion, I also consider larger dimension VARs. See on my webpage <http://fportier.files.wordpress.com/2014/09/trbbl-v1.pdf>.

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