

Decoding Equity Market Reactions to Macroeconomic News

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*The views expressed in this presentation are solely our responsibility and should not be interpreted as reflecting the views of the Federal Reserve System or of any other person associated with the Federal Reserve System.

Motivation

As Fama (1990) observed, “*disentangling cause and effect in the relations between stock returns and real activity is an interesting and formidable challenge*”.

The relations between stock returns and macroeconomic fundamentals in part **reflect information about cash flows**, but there are two other possibilities:

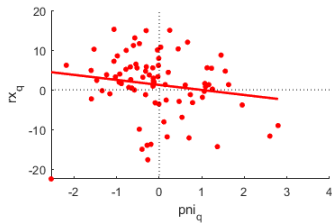
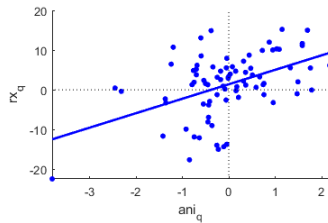
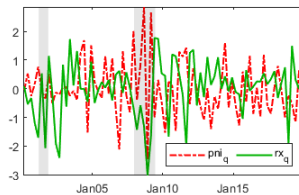
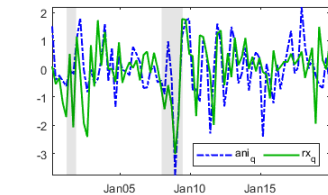
1. Stock prices and macro fundamentals can respond together to other variables→*omitted variable bias*
2. increase in stock prices is an increase in wealth, which is likely to increase the demand for consumption and/or investment goods→*endogeneity problem*

Our Contribution

We contribute to a better understanding of the causal relation between equity prices and the macro fundamentals isolating the **cash flows effect** by:

- ▶ developing two distinct indices—one measuring real economic activity and another tracking prices
- ▶ which aggregate the surprise components from multiple macroeconomic data release
- ▶ weighted by the level of attention that market participants demonstrate toward each specific economic indicator

Our Indexes



Main Findings

Our activity and a price news indexes explain at least 34% of the quarterly stock price returns variation.

To rationalize this result we study the relation of our indexes with firm level accounting data and macroeconomic data.

Following a stream of favorable macroeconomic surprises:

- ▶ firms' sales, liquidity, revenues, and profitability, but also financing and investments increase
- ▶ macroeconomic aggregates expand

Two Birds One Stone

Our approach sheds light on the relation between macro fundamentals and stock price being completely devoid of the omitted variable and endogeneity problem:

- ~~1. Stock prices and macro fundamentals can respond together to other shocks~~
⇒ we use the entire universe of macro variables
- ~~2. increase in stock prices is an increase in wealth, which is likely to increase the demand for consumption and/or investment goods~~
⇒ our indexes are unpredictable by past returns and past macro data being aggregation of innovations to market participants' information sets

Roadmap

1. Macroeconomic news
2. Activity and price news indexes
3. Stock returns reaction to the news indexes
 - ▶ Testing the exogeneity of the indexes
 - ▶ Explaining the low frequency effect of macro news
 - ▶ The lack of state dependency
4. Firm-level responses to the news indexes
5. Macro aggregate responses to the news indexes

Macro News and Asset Prices

Information about the state of the economy is released daily, and market participants form expectations.

Date	2:49am		Currency	Impact		Detail	Actual	Forecast	Previous
Mon Mar 24	9:45am	»	USD	🔴		Flash Manufacturing PMI	49.8	51.9	52.7 ▲
		»	USD	🔴		Flash Services PMI	54.3	51.2	51.0 ▲
Tue Mar 25	9:00am	»	USD	🟠		S&P/CS Composite-20 HPI y/y	4.7%	4.6%	4.5%
		»	USD	🟡		HPI m/m	0.2%	0.2%	0.5% ▲
	9:59am	»	USD	🟠		Richmond Manufacturing Index	-4	8	6
	10:00am	»	USD	🟠		CB Consumer Confidence	92.9	94.2	100.1 ▲
		»	USD	🟠		New Home Sales	676K	682K	664K ▲
Wed Mar 26	8:30am	»	USD	🟠		Core Durable Goods Orders m/m	0.7%	0.2%	0.1% ▲
		»	USD	🟠		Durable Goods Orders m/m	0.9%	-1.1%	3.2% ▲
Thu Mar 27	8:30am	»	USD	🔴		Final GDP q/q		2.3%	2.3%
		»	USD	🔴		Unemployment Claims		225K	223K
		»	USD	🟠		Final GDP Price Index q/q		2.4%	2.4%
		»	USD	🟡		Goods Trade Balance		-134.6B	-155.6B ▲
		»	USD	🟡		Prelim Wholesale Inventories m/m		0.7%	0.8% ▲
	10:00am	»	USD	🟠		Pending Home Sales m/m		0.9%	-4.6%
Fri Mar 28	8:30am	»	USD	🔴		Core PCE Price Index m/m		0.3%	0.3%
		»	USD	🟡		Personal Income m/m		0.4%	0.9%
		»	USD	🟡		Personal Spending m/m		0.5%	-0.2%
	10:00am	»	USD	🟠		Revised UoM Consumer Sentiment		57.9	57.9

Macro News and Asset Prices

GLOBAL MARKETS-Stocks, oil fall, dollar rises after U.S. data



Reuters

Nov. 15, 2017, 11:50 AM

US stock futures trade higher after jobs report disappoints

Alexandra Gibbs | @alexgibbsy

Published 6:04 AM ET Fri, 3 Nov 2017 | Updated 8:38 AM ET Fri, 3 Nov 2017



#MARKET NEWS NOVEMBER 3, 2017 / 9:14 AM / 19 DAYS AGO

TREASURIES-Yields fall after wages data for October disappoints



U.S. Treasury Bond Prices Fall on Strong Data

By Ailene O'Neil | Published October 25, 2017 | Features | Dow Jones Newswires

US Treasury yields climb after stronger industrial production data

Alexandra Gibbs | Thomas Franck

Published 5:45 AM ET Thu, 16 Nov 2017 | Updated 1:50 PM ET Thu, 16 Nov 2017



#MARKET NEWS OCTOBER 26, 2017 / 8:48 AM / 23 DAYS AGO

FOREX-Dollar index adds ground on upbeat durable goods data



US Treasury yields fall after strong housing starts data

Alexandra Gibbs | @alexgibbsy

Published 12 Hours Ago | Updated 4 Hours Ago



U.S. Stocks Rise On Above Expected U.S. GDP Growth

By IFC Markets | (Ara Zohrabian) | Market Overview | Oct 30, 2017 09:41AM ET

When releases differ from expectations, market participants adjust their investment strategies and asset prices change.

Macro News

Defined as:

$$s_{i,t} = \frac{(A_{i,t} - M_{i,t})}{std(A_{i,t} - M_{i,t})}$$

where

- ▶ the actual release of a macro variable i , $A_{i,t}$
- ▶ the market expectations for that same release, $M_{i,t}$
- ▶ standardized for their historical standard deviation

The data are available in the Bloomberg Economic Calendar (ECO). $M_{i,t}$ is the median of the forecasts made by a panel of market participants and collected by Bloomberg.

Forecasts can be submitted/updated up to the night before the release.

Activity-related Macro News

Variable	First Obs.	# Obs.	Freq.	Rel. Index	Variable	First Obs.	# Obs.	Freq.	Rel. Index
ISM Manufacturing	1/2/1998	317	M	95	Nonfarm Productivity P	5/11/1998	94	Q	43
Factory Orders	1/6/1998	315	M	85	Construction Spending MoM	10/1/1998	305	M	78
New Home Sales	1/7/1998	316	M	88	Existing Home Sales	1/6/1999	231	M	86
Initial Jobless Claims	1/8/1998	1373	W	98	Pending Home Sales MoM	1/8/1999	228	M	75
Consumer Credit	1/8/1998	316	M	42	Richmond Fed Manuf. Index	2/5/1999	222	M	72
Change in Nonfarm Payrolls	1/9/1998	317	M	99	Existing Home Sales MoM	5/11/1999	216	M	47
Unemployment Rate	1/9/1998	316	M	89	New Home Sales MoM	5/14/1999	214	M	45
Philadelphia Fed Business Outlook	1/9/1998	317	M	77	U. of Mich. Sentiment P	5/14/1999	300	M	94
Wholesale Inventories MoM	1/9/1998	304	M	79	ADP Employment Change	5/28/1999	211	M	91
Business Inventories	1/14/1998	317	M	37	U. of Mich. Sentiment F	5/28/1999	301	M	94
Industrial Production MoM	1/14/1998	316	M	87	Dallas Fed Manf. Activity	3/6/2001	183	M	64
Capacity Utilization	1/15/1998	315	M	61	Nonfarm Productivity F	3/26/2001	90	Q	43
Trade Balance	1/15/1998	317	M	82	Chicago Fed Nat Activity Index	12/28/2001	156	M	62
Monthly Budget Statement	1/16/1998	315	M	72	Durables Ex Transportation P	12/28/2001	261	M	73
Conf. Board Consumer Confidence	1/16/1998	316	M	92	Retail Sales Ex Auto and Gas	8/8/2002	178	M	55
Personal Income	1/21/1998	315	M	85	Pending Home Sales NSA YoY	8/16/2002	126	M	30
Personal Spending	1/23/1998	314	M	85	Building Permits MoM	11/15/2002	171	M	29
Leading Index	1/27/1998	317	M	82	Housing Starts MoM	1/1/2003	169	M	32
Current Account Balance	1/28/1998	104	Q	71	Average Weekly Hours All Employees	1/30/2003	301	M	28
Durable Goods Orders P	1/28/1998	308	M	92	Personal Consumption A	1/30/2003	85	Q	67
Housing Starts	1/30/1998	313	M	88	NFIB Small Business Optimism	2/28/2003	170	M	58
Change in Manuf. Payrolls	1/30/1998	305	M	69	Personal Consumption S	2/28/2003	83	Q	67
GDP Annualized QoQ	1/30/1998	106	Q	96	Change in Private Payrolls	3/27/2003	169	M	35
Retail Sales Advance MoM	2/2/1998	316	M	93	Personal Consumption T	3/27/2003	85	Q	67
Retail Sales Ex Auto MoM	2/2/1998	316	M	65	JOLTS Job Openings	4/15/2003	146	M	51
Continuing Claims	2/3/1998	1094	W	69	Kansas City Fed Manf. Activity	3/23/2005	149	M	23
Building Permits	2/27/1998	261	M	61	Manufacturing (SIC) Production	6/1/2005	143	M	19
GDP Annualized QoQ	2/27/1998	104	Q	96	Wholesale Trade Sales MoM	10/25/2005	109	M	16
Empire Manufacturing	3/12/1998	259	M	83	MNI Chicago PMI	6/27/2006	316	M	81
Wards Total Vehicle Sales	3/17/1998	256	M	42	ISM Services Index	7/27/2006	303	M	80
NAHB Housing Market Index	3/26/1998	254	M	44	Cap Goods Ship Nondef Ex Air P	1/26/2012	139	M	49
GDP Annualized QoQ	3/26/1998	104	Q	96	Cap Goods Orders Nondef Ex Air P	6/15/2012	156	M	53

Price-related Macro News

Variable	First Obs.	# Obs.	Freq.	Rel. Index	Variable	First Obs.	# Obs.	Freq.	Rel. Index
PCE Core Deflator MoM	1/2/1998	226	M	67	Core PCE QoQ T	1/15/1998	70	Q	90
PCE Core Deflator YoY	1/6/1998	235	M	97	PPI Final Demand YoY	11/15/2002	243	M	68
GDP Price Index A	1/7/1998	96	Q	78	CPI YoY	2/21/2003	248	M	20
PPI Ex Food and Energy MoM	1/8/1998	316	M	40	CPI Ex Food and Energy YoY	2/21/2003	247	M	60
PPI Final Demand MoM	1/8/1998	316	M	95	PPI Ex Food and Energy YoY	7/11/2003	239	M	58
GDP Price Index S	1/8/1998	97	Q	69	PCE Deflator YoY	5/28/2004	234	M	77
GDP Price Index T	1/8/1998	99	Q	66	CPI Index NSA	8/17/2004	232	M	77
Core PCE QoQ A	1/9/1998	70	Q	55	FHFA House Price Index MoM	4/22/2008	192	M	77
Core PCE QoQ S	1/9/1998	71	Q	68	CPI Core Index SA	2/19/2010	136	M	67
CPI MoM	1/13/1998	317	M	48	PCE Deflator MoM	3/30/2012	145	M	67
CPI Ex Food and Energy MoM	1/13/1998	316	M	33	PPI Ex Food, Energy, Trade MoM	12/12/2014	113	M	67

Exploiting the Universe of Macro News

Focusing only on one data release in isolation, *as most of event studies have done*, may provide a partial and incorrect view of why the market reacts to a macro news.

- ▶ Statistical reports contain more info than the headline.
e.g. the employment report contains 72 data releases:
unemployment ↓ - labor participation ↑ - payrolls ↓ ⇒ we need all the info
- ▶ Different reports maybe released on the same day/time

Thu Oct 17	8:30am	)	USD	🇺🇸	Core Retail Sales m/m
		)	USD	🇺🇸	Retail Sales m/m
		)	USD	🇺🇸	Unemployment Claims
		)	USD	🏭	Philly Fed Manufacturing Index
	9:15am	)	USD	🏭	Capacity Utilization Rate
		)	USD	🏭	Industrial Production m/m
	10:00am	)	USD	🏭	Business Inventories m/m
		)	USD	🏭	NAHB Housing Market Index
	4:00pm	)	USD	🏭	TIC Long-Term Purchases
		)	USD	🏭	TIC Long-Term Purchases

Macro News Indexes

We aggregate news relative to real activity and news relative to prices in two separate indexes.

$$ani_t = \sum_{i=1}^{n_a} s_{i,t} w_i \quad pni_t = \sum_{i=1}^{n_p} s_{i,t} w_i$$

where n_a and n_p are the number of real activity and price releases, respectively, and

$$w_i = \frac{W_i}{\sum_{i=1}^{n_j} W_i}, \quad \text{where } j = a, p$$

where W_i is the relevance index provided by Bloomberg.

Relevance index: number of Bloomberg users that set up an automatic alert to be notified when a given macroeconomic variable news has been released.

Macro News and Daily Stock Returns

Our first set of results is based on the following regression:

$$rx_t = \alpha + \beta ani_t + \gamma pni_t + \delta mps_t + \phi rx_{t-1} + u_t.$$

where $rx_t = \log(S\&P500_t) - \log(S\&P500_{t-1})$ and mps_t is Bu, Rogers and Wu (2021) monetary policy shock.

ani_t	pni_t	mps_t	rx_{t-1}	R^2	R^2_{adj}
0.07	0.01	-0.06	-0.10	2%	1%
3.71	0.54	-2.35	-4.21		
0.07		-0.06	-0.10	2%	1%
3.70		-2.34	-4.26		
	0.01	-0.06	-0.10	1%	1%
	0.57	-2.27	-4.29		

Macro News and Asset Prices

Event studies on narrow windows around economic announcements have shown that asset prices efficiently incorporate macroeconomic information.

Andersen et al. (2003); Gurkaynak, Sack and Swanson (2005); Faust et al. (2007); Andersen et al. (2007); Swanson and Williams (2014); Altavilla, Giannone and Modugno (2017); Gurkaynak, Kisacikoglu and Wright (2020).

But they cannot elucidate the connection between asset prices and macroeconomic fundamentals

⇒ Does the information effect persist beyond these brief periods or just dissipate?

Quarterly Aggregation

Altavilla, Giannone and Modugno (2017) show that 45% of bond yields quarterly changes fluctuation are explained by macro news.

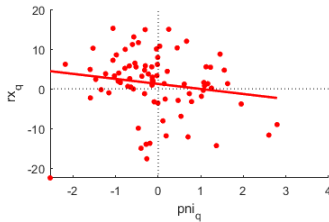
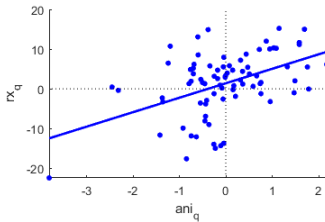
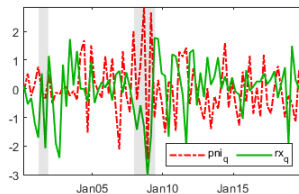
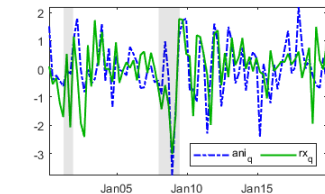
$$ani_q = \sum_{t=T_{q-1}+1}^{T_q} \sum_{i=1}^{n_a} s_{i,t} w_i \quad pni_q = \sum_{t=T_{q-1}+1}^{T_q} \sum_{i=1}^{n_p} s_{i,t} w_i$$

where T_q is the last day in quarter q and

$$rx_q = \sum_{t=T_{q-1}+1}^{T_q} rx_t = \log(S\&P500_{T_q}) - \log(S\&P500_{T_{q-1}})$$

Moreover, firm-specific accounting data are available at quarterly frequency, we aggregate our news index at quarterly frequencies.

Macro News and Quarterly Stock Returns



Macro News and Quarterly Stock Returns

$$rx_q = \alpha + \beta ani_q + \gamma pni_q + \delta mps_q + \phi rx_{q-1} + u_q.$$

ani_q	pni_q	mps_q	rx_{q-1}	R^2	R^2_{adj}
3.97	-2.05	-0.79	-0.06	34%	30%
3.36	-3.38	-0.76	-0.50		
3.61		-0.86	-0.03	26%	23%
3.60		-0.81	-0.22		
	-1.38	-1.06	0.06	6%	2%
	-1.16	-0.85	0.35		

⇒ Where 34% is a lower bound.

We do not include all the U.S. macro news, the international news and, the non-headline news factor a la Gurkaynak et al. (2020).

Are these indexes exogenous?

We regress *ani* on up to five lagged values of the *S&P500* quarterly returns:

c	rx_{q-1}	rx_{q-2}	rx_{q-3}	rx_{q-4}	rx_{q-5}	R^2_{adj}
-0.12 -0.85	0.03 1.39					3%
-0.10 -0.71	0.03 1.40	-0.01 -0.39				2%
-0.08 -0.53	0.03 1.39	-0.01 -0.32	-0.01 -0.67			1%
-0.13 -0.81	0.03 1.67	-0.01 -0.32	-0.02 -0.79	0.03 1.48		4%
-0.07 -0.46	0.03 1.52	-0.01 -0.68	-0.02 -0.83	0.03 1.81	-0.03 -1.95	7%

Are this indexes exogenous?

We regress pni on up to five lagged values of the $S\&P500$ quarterly returns:

c	rx_{q-1}	rx_{q-2}	rx_{q-3}	rx_{q-4}	rx_{q-5}	R^2_{adj}
-0.04 <i>-0.44</i>	-0.01 <i>-0.81</i>					-1%
-0.05 <i>-0.50</i>	-0.01 <i>-0.81</i>	0.01 <i>0.38</i>				-2%
-0.03 <i>-0.25</i>	-0.01 <i>-0.85</i>	0.01 <i>0.51</i>	-0.02 <i>-1.56</i>			-1 %
-0.06 <i>-0.53</i>	-0.01 <i>-0.56</i>	0.01 <i>0.53</i>	-0.02 <i>-1.74</i>	0.02 <i>1.72</i>		0%
-0.07 <i>-0.59</i>	-0.01 <i>-0.53</i>	0.01 <i>0.58</i>	-0.02 <i>-1.72</i>	0.02 <i>1.57</i>	0.01 <i>0.41</i>	-2%

Are this indexes exogenous?

We regress *ani* on the first eight lagged factors extracted from FRED-QD, the dataset described in McCracken and Ng (2016):

c	f1	f2	f3	f4	f5	f6	f7	f8	R^2_{adj}
-0.10	0.48								2%
-0.97	1.32								
-0.10	0.47	0.07							0%
-0.87	1.09	0.17							
-0.17	0.60	-0.53	-1.13						5%
-1.32	1.59	-1.02	-1.71						
-0.08	1.02	-0.51	-1.47	-1.25					8%
-0.65	2.27	-1.22	-2.21	-1.47					
-0.07	1.01	-0.51	-1.47	-1.26	-0.06				6%
-0.26	1.92	-1.28	-2.15	-1.54	-0.05				
-0.21	1.40	-0.80	-1.36	-1.16	-0.23	-1.39			6%
-0.90	2.68	-1.66	-1.90	-1.42	-0.18	-1.27			
-0.18	1.33	-0.83	-1.36	-1.15	-0.37	-1.40	0.30		5%
-0.77	2.51	-1.63	-1.88	-1.42	-0.28	-1.28	0.39		
-0.24	1.30	-0.83	-1.53	-1.16	-0.12	-1.27	0.09	0.55	4%
-0.80	2.28	-1.58	-1.51	-1.43	-0.07	-1.04	0.10	0.36	

Are this indexes exogenous?

We regress pni on the first eight lagged factors extracted from FRED-QD, the dataset described in McCracken and Ng (2016):

c	f1	f2	f3	f4	f5	f6	f7	f8	R_{adj}^2
-0.07	0.04								-1%
-0.70	0.19								
-0.06	0.01	0.17							-3%
-0.53	0.05	0.67							
-0.02	-0.06	0.48	0.59						-3%
-0.16	-0.30	0.97	0.77						
-0.03	-0.09	0.48	0.61	0.09					-4%
-0.23	-0.35	0.97	0.73	0.17					
0.05	-0.16	0.43	0.63	0.03	-0.51				-6%
0.23	-0.54	0.91	0.76	0.05	-0.36				
0.05	-0.15	0.43	0.63	0.03	-0.51	-0.03			-7%
0.19	-0.30	0.78	0.72	0.06	-0.35	-0.02			
-0.02	0.06	0.52	0.64	0.01	-0.09	-0.01	-0.88		-8%
-0.10	0.10	0.96	0.75	0.02	-0.07	0.00	-1.14		
-0.36	-0.12	0.53	-0.32	-0.04	1.35	0.71	-2.05	3.07	-1%
-1.43	-0.22	1.09	-0.35	-0.06	1.33	0.58	-2.48	2.60	

Intuition

Let $y_t = \log(S\&P500_t)$:

$$\blacktriangleright y_{t+1} - y_t = news_{t+1} + noise_{t+1}.$$

$$\blacktriangleright y_{t+2} - y_t = (y_{t+2} - y_{t+1}) + (y_{t+1} - y_t) =$$

$$= (news_{t+2} + noise_{t+2}) + (news_{t+1} + noise_{t+1}).$$

$$\begin{aligned}\blacktriangleright y_{t+h} - y_t &= \sum_h (y_{t+h} - y_{t+h-1}) = \\ &= \sum_h news_{t+h} + \sum_h noise_{t+h}.\end{aligned}$$

Intuition

Let $y_t = \log(S\&P500_t)$:

$$\blacktriangleright y_{t+1} - y_t = news_{t+1} + noise_{t+1}.$$

$$\begin{aligned}\blacktriangleright y_{t+2} - y_t &= y_{t+2} - y_{t+1} + y_{t+1} - y_t = \\ &= news_{t+2} + noise_{t+2} + news_{t+1} + noise_{t+1}.\end{aligned}$$

$$\begin{aligned}\blacktriangleright \frac{1}{h} (y_{t+h} - y_t) &= \frac{1}{h} (\sum_h y_{t+h} - y_{t+h-1}) = \\ &= \frac{1}{h} \sum_h news_{t+h} + \frac{1}{h} \sum_h noise_{t+h}.\end{aligned}$$

our hypothesis is that while $\frac{1}{h} \sum_h news_{t+h}$ is persistent,

$$\frac{1}{h} \sum_h noise_{t+h} \xrightarrow{h} 0$$

Signal vs. Noise

The persistency of a series y_t can be gauged by considering $\text{var}(y_t - y_{t-h})/h$, as a function of h (Cochrane, 1988).

- ▶ if $\text{var}(y_t - y_{t-h})/h$ is constant wrt. h then y_t is a random walk.
- ▶ if $\text{var}(y_t - y_{t-h})/h$ declines wrt. h then the effect of shocks on y_t is partially reversed after some time .
- ▶ if $\text{var}(y_t - y_{t-h})/h$ increases wrt. h then it takes time for shocks to be absorbed.

Signal vs. Noise

Let's define

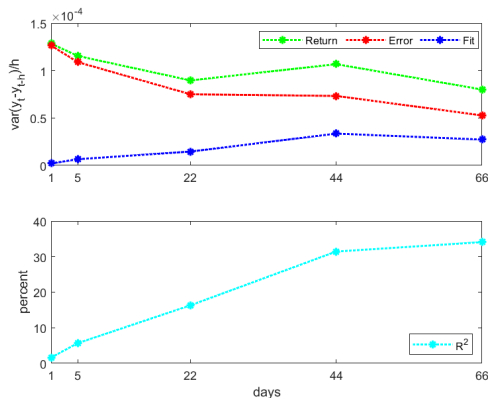
$$rx_{t-h,t} = \sum_{j=t-h}^t rx_j$$

$$ani_{t-h,t} = \sum_{j=t-h}^t ani_j \quad pni_{t-h,t} = \sum_{j=t-h}^t pni_j.$$

For h from 1 to 66 we estimate:

$$rx_{t-h,t} = \alpha^{(h)} + \beta^{(h)} ani_{t-h,t} + \gamma^{(h)} pni_{t-h,t} + \epsilon_{t-h,t}$$

Signal vs. Noise



- ▶ Return is $1/h * \text{var}(rx_{t-h,t})$,
- ▶ Fit is $1/h * \text{var}(\widehat{rx}_{t-h,t}) = 1/h * \text{var}(\widehat{\alpha}^{(h)} + \widehat{\beta}^{(h)} ani_{t-h,t} + \widehat{\gamma}^{(h)} pni_{t-h,t})$
- ▶ Error is $1/h * \text{var}(\widehat{\epsilon}_{t-h,t})$

Notice that

$$R^2(h) := \frac{1/h \text{ var } (\widehat{rx}_{t-h,t})}{1/h \text{ var } (\widehat{rx}_{t-h,t}) + 1/h \text{ var } (rx_{t-h,t} - \widehat{rx}_{t-h,t})},$$

State Dependency?

The existence of a causal relation between macro news and stock prices has been deemed as controversial:

- ▶ Earlier studies found insignificant reactions of stock prices to macro surprises.
Cutler, Poterba and Summers (1988), Hardouvelis (1987), Pearce and Roley (1985)
- ▶ Recent studies found that the reaction is state dependent.
⇒ Stock prices reaction to *specific* macro releases depends on the current stage of the business cycle.
Elenev et al. (2024), Andersen et al. (2007), Boyd, Hu and Jagannathan (2005), McQueen and Roley (1993).

Lack of State Dependency for the Activity Index

We our indexes with measure of business cycle or monetary policy stands x_q :

$$rx_q = \alpha + \beta ani_q + \tilde{\beta} ani_q * x_q + \gamma pni_q + \tilde{\gamma} pni_q * x_q + \delta mps_q + \theta x_q + \phi rx_{q-1} + u_q$$

	Unemp. gap	Output gap	1-year yield
ani_q	3.33 <i>2.75</i>	2.99 <i>3.44</i>	3.74 <i>2.72</i>
$ani_q * x_q$	0.33 <i>0.85</i>	-0.49 <i>-1.29</i>	0.38 <i>0.63</i>
$\beta + \tilde{\beta} * x_q$			
low	3.24	4.35	3.84
medium	3.49	3.59	4.14
high	4.29	2.81	4.60

In contrast with McQueen and Roley (1993), Boyd, Hu and Jagannathan (2005), and Elenev et al. (2024), who found that the sign and/or the existence of the reaction was depending on the stage of the business cycle.

Lack of State Dependency for the Price Index

$$rx_q = \alpha + \beta ani_q + \tilde{\beta} ani_q * x_q + \gamma pni_q + \tilde{\gamma} pni_q * x_q + \delta mps_q + \theta x_q + \phi rx_{q-1} + u_q$$

	Unemp. gap	Output gap	1-year yield
pni_q	-2.13 -3.48	-1.94 -3.09	-1.34 -1.22
$pni_q * x_q$	0.18 0.45	-0.23 -0.62	-0.50 -1.40
$\gamma + \tilde{\gamma} * x_q$			
low	-2.18	-1.31	-1.46
medium	-2.05	-1.66	-1.86
high	-1.62	-2.02	-2.46

Firm's Reaction

Are our indexes capturing also innovations for CEOs and CFOs?

$$y_{i,q+h} - y_{i,q-1} = \alpha_{i,h} + \beta_h ani_q + \gamma_h pni_q + \phi_h mps_q + \Phi'_{1,h} Z_{i,q-1} \dots \\ + \Phi'_{2,h} W_{q-1} + \delta_h^F Fiscal_q + \delta_h^Q Qtr_q + \varepsilon_{i,q+h},$$

- ▶ $\alpha_{i,h}$ is a firm fixed effect.
- ▶ $Z_{i,t-1}$ consists of leverage, log size, current assets, and $y_{i,q} - y_{i,q-1}$.
- ▶ W_{t-1} consists of four lags of real GDP growth, the inflation rate, the unemployment rate.
- ▶ $Fiscal$ and Qtr are fiscal quarter and calendar quarter dummies.
- ▶ β_h and γ_h are the average cumulative (log-)change over horizon h due to a one standard deviation change in our indexes

Standard errors are clustered at the firm and time level

Firm's Reaction

- ▶ **Revenues and Profitability**

- + Sales, Income, Gross Margin

- ▶ **Liquidity and Capital Structure**

- + Cash, Receivables, Inventories, Book Equity, Liabilities

- ▶ **Financing and Investment**

- + Equity Issuance, Net Debt Issuance, Total Payout, R&D Expenditures, CAPX

$$\Delta Y_{i,q-1,q+h} = 100 \times \frac{Y_{i,q+h} - Y_{i,q-1}}{ATQ_{q-1}}$$

All accounting variables are winsorized at the top and bottom 1 percent to mitigate the influence of outlier.

Revenues and Profitability

	<i>MKT</i>	(1) Sales	(2) Income	(3) Gross Margin
Panel A: Same quarter				
ani	7.531*** (3.228)	1.263*** (3.925)	0.240*** (2.751)	0.455*** (3.287)
pni	-4.362*** (-2.762)	0.379 (1.119)	-0.025 (-0.627)	-0.163 (-1.619)
Panel B: One quarter ahead				
ani	10.891*** (2.928)	2.677*** (3.203)	0.111 (1.372)	0.585* (1.974)
pni	-7.990*** (-2.959)	-0.202 (-0.248)	-0.132 (-1.373)	-0.363* (-1.697)
Panel C: Four quarter ahead				
ani	10.516*** (2.898)	3.313*** (2.944)	0.165 (1.201)	0.249 (0.805)
pni	-12.360*** (-3.153)	-2.034** (-2.053)	-0.291* (-1.737)	-0.607*** (-2.673)

Balance Sheet

	(1) Cash	(2) Rec.	(3) Inv.	(4) Book Equity	(5) Liabilities
Panel A: Same quarter					
ani	1.215** (2.644)	1.305*** (3.334)	0.179 (1.106)	1.152** (2.525)	0.143 (0.667)
pni	-0.222 (-0.486)	-0.062 (-0.153)	0.460*** (2.807)	0.034 (0.091)	0.112 (0.616)
Panel B: One quarter ahead					
ani	1.925*** (3.277)	2.537*** (3.023)	0.657 (1.557)	1.820** (2.386)	0.496 (1.150)
pni	-1.827*** (-3.682)	-0.400 (-0.519)	0.496 (1.281)	-0.717 (-1.285)	-0.021 (-0.071)
Panel C: Four quarter ahead					
ani	1.637* (1.911)	3.668*** (3.220)	2.032** (2.157)	2.729*** (3.181)	1.460* (1.801)
pni	-2.045** (-2.546)	-2.415** (-2.222)	-0.659 (-0.709)	-2.192*** (-2.953)	-1.365** (-2.073)

Financing and Investment

	(1) SSTK	(2) Net Debt Iss.	(3) Total P.O.	(4) R&D	(5) CAPX
Panel A: Same quarter					
ani	0.113 (0.910)	0.022 (0.689)	0.006 (0.237)	-0.026 (-1.495)	0.023*** (3.806)
pni	-0.166 (-1.278)	-0.022 (-0.616)	-0.007 (-0.379)	0.024 (1.538)	0.008 (1.222)
Panel B: One quarter ahead					
ani	0.246*** (2.856)	0.067* (1.779)	0.040 (1.636)	0.022 (0.716)	0.048*** (3.473)
pni	-0.327*** (-4.224)	-0.046 (-1.218)	-0.011 (-0.520)	0.021 (0.895)	-0.002 (-0.178)
Panel C: Four quarter ahead					
ani	0.093 (0.913)	0.149*** (3.156)	0.112*** (2.813)	0.045 (1.101)	0.101*** (3.162)
pni	-0.228** (-2.255)	-0.129*** (-2.839)	-0.092** (-2.568)	-0.048 (-1.224)	-0.058* (-1.932)

Firm's Reaction

To summarize: *a stream of macro surprises are followed by both mechanical and discretionary firm's responses.*

- ▶ A quarter of positive activity news is followed by an increase of sales, liquidity, and profitability, but also financing, and investment.
- ▶ On the contrary, a sequence of positive price news is followed by a deterioration of firms' performance at 1-year horizon.

Unveiling a Causal relation

- ▶ Variables that capture *discretionary* firms' behavior react—financing and investment.
- ▶ Tanaka et al. (2020) shows that firms' performance are associated to their previous year GDP forecasts, and that larger and more cyclical firms make forecasts closer to professionals forecasters.

A corollary result is that market participants are rational: their reaction to macroeconomic news is effectively related to their effects on corporate outcomes.

Macro Consequences of Firm-level Reactions

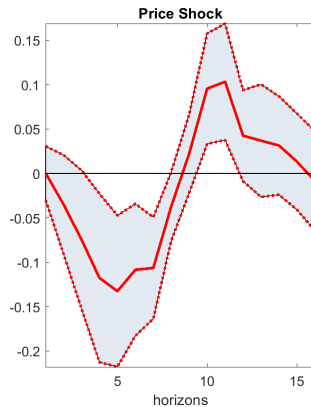
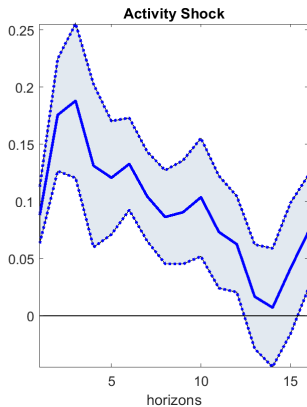
Our second set of results is based IRFs from the following local projections, as in Ramey (2016):

$$y_{q+h} - y_{q-1} = \alpha_h + \beta_h ani_q + \gamma_h pni_q + \phi_h mps_q + \Phi'_{1,h} Z_{q-1} + \varepsilon_{q+h},$$

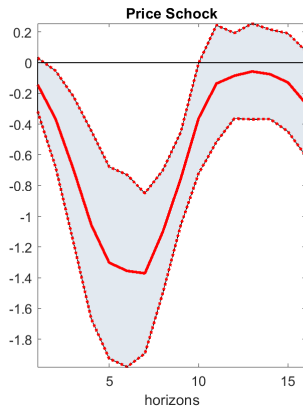
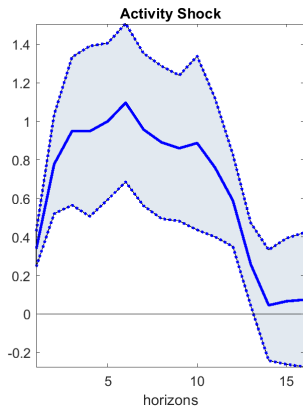
Where:

- ▶ α_h is the constant.
- ▶ Z_{q-1} contains $y_q - y_{q-1}$, ani_{q-1} , pni_{q-1} and mps_{q-1} , the lagged growth rates of IP, PPI, CPI, and the lagged levels of the unemployment rate, and 1-year Gov. bond yields.
- ▶ β_h and γ_h are the average cumulative (log-)change over horizon h due to a one standard deviation change in our indexes.

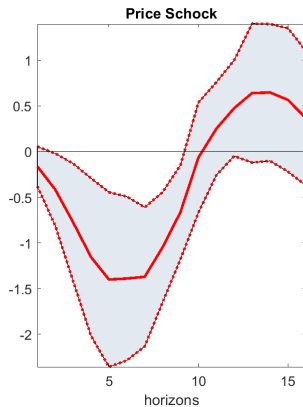
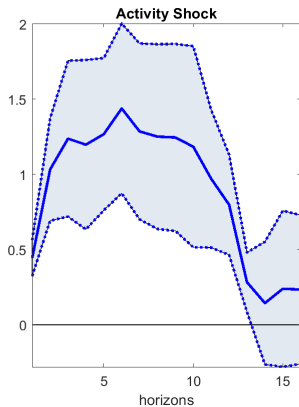
Hours Worked



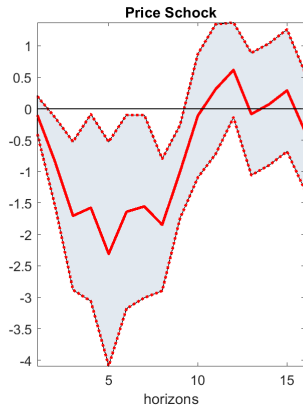
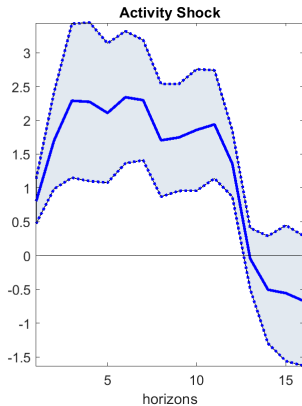
Capacity Utilization



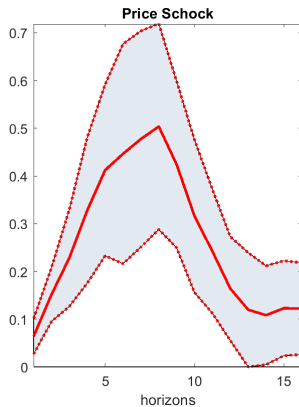
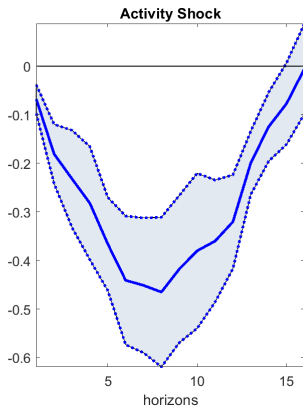
Industrial Production



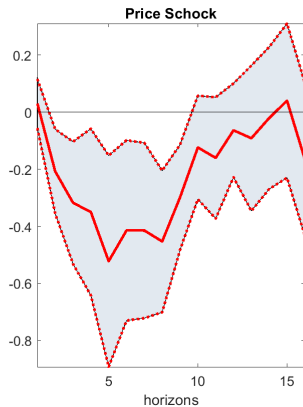
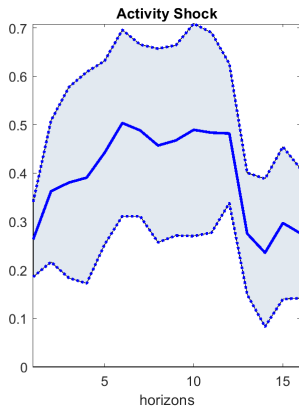
Real Investment



Unemployment Rate



Real GDP



Third Finding

To summarize: *Firm-level outcomes have macroeconomic consequences.*

A sequence of positive activity (price) news over a quarter is followed by

- ▶ changes in aggregate temporary production factors and, therefore, production.
Hours worked, capacity utilization, and industrial production $\uparrow (\downarrow)$.
- ▶ but also changes in aggregate indicators that capture more enduring changes of the economy.
Investment $\uparrow (\downarrow)$, unemployment $\downarrow (\uparrow)$.
- ▶ an expansion (reduction) of the summary measure of the health of the economy, the real GDP.

Conclusions

We construct two indexes of macroeconomic news: an activity news index and a price news index.

- ▶ We aggregate all the universe of macroeconomic news.
→ No omitted variables bias
- ▶ The weights are based on a measure of market attention to macro releases.

These indexes capture the *cash flow effect* of macroeconomic fundamentals on stock prices.

- ▶ They are unpredictable by past stock returns and macro information.
→ No endogeneity problem
- ▶ The activity index is positively related to stock prices while the price index is negatively related.
- ▶ Together the indexes explain 34% of the variance of quarterly stock returns.

Conclusions

The relation between our indexes and the equity market is rationalized by their propagation into the real economy.

- ▶ Firms react to our macroeconomic indexes.
A stream of favorable news is followed by *mechanical* firm-level responses, but also by *discretionary* responses like financing and investment.
- ▶ Firm-level reactions have significant macroeconomic consequences.
The aggregate economy responds by increasing the utilization of existing production factors, but also by expanding them with lower unemployment and higher investment, resulting in higher real GDP.