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#### ARTICLE INFO

# ABSTRACT



\*A .--- } - } - . -

ł ļ ţ ļ Ļ Į. Į А ļ Ļ Į, ∮ (NFP), Ιţ - S (ISM), Μ - 11 Ļ (GDP). F-S - 1994 - 1 ~ NFP, ISM, M 2018, GDP -10.1 **J**, 9.1 Į, 7.5 🖌 - ţ Ł Ì . U S&P 500 Į ļ 4 5 -Į Į, - - J 8:30 - NFP GDP 10 - ISM. E - I 7 ł ļ ļļ ł ļ (2015). B ł Μ ļ 0.69 Į - -FOMC - .<sup>1</sup> T ~ NFP, ISM, GDP ļ Į, - FOMC. ļ ş ļļ ş -E -Z NFP, ISM, GDP, FOMC. ĻĻ ł U Į. ļ ļ, Μ ş --ĻĻ Ļ

49 44439861 177.194 T (5(1)) ) TJ 0 T /F2 1 T 6.3761 0 0 6.3387772.23861 177.194 T () TJ 0.0001 T /F1 1 T 7.9701 0 0 7.93761 5238 8)1<u>4.9</u>9 <u>(</u> ł 1 - 1 -- 24- -4 I . S **↓** -2011 \_ ţ -FOMC ~ -. Aş ٣, , - -ş ~ NFP, ISM GDP - 🖡 -<u>ا</u> **\$ \$ \$** FOMC

VI . T Į Т ł VI ι. T 55 5 Ł Т ł . T 0 Į - z ţ Į. Į

Pre-announcement returns: A Ļ . C 🚦 Ĩ Z - 1 -4-₿, NFP, ISM, GDP FOMC. P ł § 5.66% ş z 44 -.<sup>5</sup> E FOMC, ţ Ļ L Μ (2015), 3.41% Į Į, 36 *~*. В 9.10%, 252 Z ł IJ ļ -Į, ₿. C -NFP, ISM, FOMC GDP, Į, \$ ---, NFP, ISM . C GDP Ļ FOMC, 3.41% §. 2.25% Ļ -0 ļļ Ļ ч<u>.</u> Г . S 🖌 NFP, ISM, GDP -<u>I</u>, <u>I</u> FOMC,

 Image: Solution of impact uncertainty: O

 Image: Solution of impact uncertainty: O

VI ļ VI.S NFP, ISM, GDP, FOMC, ļ VI ļļ 102.71 ļ 79.54 ł ļ . В VI ļ -7.72 1.14 Į. \*\* G VΙ VI L --I ļ

<sup>4 0</sup> ļ -\$ \$ ₿. U₿ ţţ ţ ş - 12 ---<sup>5</sup> T --- NFP, ISM 8 ş - FOMC. GDP, - 🖁 --,

VI Į Ĩ ļļ . **.** I VI (.., ų 0.92 . B - 1 - 1 ų Į ļ 4.09. I ļ ļ ŗ ł VI ( ł ), ļļ ļļ 3.01. T ļ - ] ] ł <u>ا</u>. C

- C -8( )14 ( ) TJ /F2 1 T 6.3761 0 0 6.37170 90.5731 139.473 T ( ) TJ -0.0113 T /F1 1 T

-



#### Investors

 $T = \frac{1}{2} =$  $- \{-\alpha W_2\},$ (3)  $-\alpha > 0$  i - i  $W_2$  i  $\lambda < rac{2}{lpha^2}.$ (4)

S  $\sigma^{2}$   $\frac{1}{2}$   $\sigma^{2}$   $\frac{1}{2}$   $\sigma^{2}$   $\frac{1}{2}$   $\sigma^{2}$   $\frac{1}{2}$   $\sigma^{2}$   $\frac{1}{2}$   $\sigma^{2}$   $\frac{1}{2}$   $\frac{1}$ <u>ب</u> - -.

#### Time line

Т ş:

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$$J_{1} = - \left\{ -\alpha \left[ W_{0} + \theta_{0} (D + \sigma \varepsilon_{1} - \alpha (1 - \delta) \sigma^{2} - P_{0}) + \frac{1}{2} \alpha (1 - \delta) \sigma^{2} \right] \right\},$$

$$(9)$$

$$E J_1 | \sigma = - \left\{ -\alpha \left[ W_0 + \theta_0 (D - P_0) \right] + \alpha^2 \left[ \frac{1}{2} (1 - \delta) - (1 - \delta) \theta_0 - \frac{1}{2} \delta \theta_0^2 \right] \sigma^2 \right\} (10)$$

$$\equiv - \left\{ -\alpha \left[ W_0 + \theta_0 (D - P_0) \right] + \alpha^2 Q(\theta_0, \delta) \sigma^2 \right\}, \quad (10)$$

$$Q(\theta_0, \delta) \equiv \frac{1}{2}(1-\delta) - (1-\delta)\theta_0 - \frac{1}{2}\delta\theta_0^2, \qquad (11)$$

$$\frac{1}{\delta}\sigma^2 \qquad T \qquad \theta_0 \quad \frac{1}{\delta}\sigma^2 \quad \frac{1}{\delta}\sigma^2 \quad \frac{1}{\delta}$$

 $E J_1 = E E J_1 | \sigma$ 

$$= -e^{-\alpha W_0 + \theta_0 (D - P_0)} \int_{\lambda_0}^{\infty} e^{-\alpha^2 Q(\theta_0, \delta) x} \frac{1}{\lambda} e^{-\frac{x - \lambda_0}{\lambda}} dx$$
$$= -e^{-\alpha W_0 + \theta_0 (D - P_0) - \alpha^2 Q(\theta_0, \delta) \lambda_0} \frac{1}{1 + \alpha^2 \lambda Q(\theta_0, \delta)}, \quad (12)$$

 $1+\alpha^2 Q(\theta_0,\delta)$ 

$$= 1 + \alpha^{2} \lambda \left[ \frac{1}{2} (1 - \delta) - (1 - \delta) \theta_{0} - \frac{1}{2} \delta \theta_{0}^{2} \right] > 0.$$
(13)  
I ,  $\theta_{0} = 1, \frac{1}{2}, \frac{1}{2},$ 

#### 2.4. Return and variance

$$R_t = P_t - P_{t-1}, \quad t = 1, 2.$$
(18)

$$E R_1 = \alpha \delta(\lambda_0 + \lambda) + \frac{\frac{1}{2}\alpha^3 \lambda^2}{1 - \frac{1}{2}\alpha^2 \lambda} > 0, \qquad (19)$$

$$V R_1 = \delta(\lambda_0 + \lambda) + \alpha^2 (1 - \delta)^2 \lambda^2.$$
(19)

. I

$$E R_2 = \alpha(1-\delta)(\lambda_0+\lambda) > 0, \qquad (20)$$

V 
$$R_2 = (1 - \delta)(\lambda_0 + \lambda) + \alpha^2 (1 - \delta)^2 \lambda^2$$
. (20)

e -- 0. A j • T 🚽 ļ & --- į -Ļ ļ λ JTJ /F2 1 Tf 6.3761 0 0 6.3761 225.0264 586.5014-553.034.Tm .rio1 1 Tf 7.9701 0 0 7.9701 76.2375 544.7323 95m 0 34.Tm .rio , 0. A - - z z ---0 🖌 λ ا پ ا **↓** & 0 1 • T & - --. D -Į σιļ . - . . I δ. ļ ļ Ì ,. • T -& <u>I</u> -- -Į --1 ļ

		ţ		F	OMC	,		-
-}			<u>I</u> .	. <b>т</b> . Т		FOMC		-
	ş.	-	ş		- <u>I</u>	В	-	
D	J	ļ	ļ	- <u></u>		I.		
L		Μ		(2015)	F			

	PA								P∮-A							
	(4	- 5	)						(, 1 1 - 5	, I., I.	+ 55	)				
	M	TS	S	S	К -	М	М		M	TS	S	S	К -	М	Μ	0 🖁
FOMC	27.14	5.95	62.9	1.3	5.2	-164	336		6.19	1.28	66.9	0.2	2.1	-207	278	190
NFP	10.10	3.63	43.4	-0.2	3.0	-165	177		2.48	0.69	56.2	-0.2	1.5	-204	212	243
ISM	9.14	2.10	72.5	-1.1	7.0	-461	213		2.04	0.66	51.1	0.2	1.6	-150	205	276
GDP	7.46	2.08	54.7	0.9	10.4	-233	356		1.08	0.45	36.4	-0.7	7.8	-207	138	233
IP	5.23	1.19	68.0	-0.7	4.8	-339	291		-6.24	-2.33	41.4	-1.3	4.6	-195	115	240
PI	3.50	0.94	58.3	-1.0	3.8	-248	191		1.13	0.87	20.3	0.0	1.9	-80	75	244
HST	2.46	0.69	53.9	-0.2	4.2	-177	279		1.02	0.59	26.0	-0.1	3.0	-100	91	230
INC	1.56	0.95	53.8	-0.1	5.4	-259	356		-0.29	-0.34	27.7	-0.2	7.8	-207	169	1073
PPI	-0.58	-0.17	52.3	-2.4	14.3	-392	129		-3.47	-1.60	33.6	-0.6	3.3	-137	113	241
CPI	-2.14	-0.69	47.1	-0.8	2.8	-208	130		2.08	0.91	34.9	-0.7	6.3	-188	155	232
CSI	-4.03	-0.88	68.7	0.9	8.1	-232	439		-4.10	-1.55	39.7	-0.7	3.8	-211	128	226
			Clos	e to Ope	n						Ope	n to Clo	se			
			(4	9:30	)						(9:30	4	)			
	M	TS .	S	S	К -	М	M		M	TS ,	S	S	К -	М	M	0 🖌
Non-Ann	0.69	0.78	62.1	-0.7	13.5	-668	547		0.09	0.07	97.7	0.0	10.3	-781	920	4976
All Days	1.99	2.45	62.60	-0.6	11.8	-668	547		1.20	0.94	98.6	0.0	8.8	-781	920	5965

Τţ ∮-∽ 0 ļļ -11 Į. ţ ļ - **↓** ( М -С ţ ş : F \$. (FOMC), **Ι**.Τ - S (ISM), G- 👪 D (GDP), 5 -(IP), (NFP), I I М ş Ł P--} (PI), § (HST), ---1 -(INC), -(PPI), 🚦 - -(CPI), - S Į --FOMC C 🖡 (CSI). M ~ FOMC L <u></u>μ. Τ 4 ţ I ş Į ţ Ł Т ş 5% . &N -A -1 ş FOMC, NFP, ISM, ~ GDP ļ \$; &A D ş. ∮. F ∽ N ⊨-A ļ ş -\$ -9:30 A D 4 -S ţ 9:30 4.T 5 1 -- 1994 M 2018.

L -ι. S В -§ 10.10 - NFP 3.63; 9.14 , t-<del>§</del> t-§ 2.10; 7.46 ∮ ~ GDP \_\_\_\_\_ 2.08. T - - - - --. A ---- -1% Į. ŗ Ł : 9.80 ţţ ļ ţ ļ - NPF, 10.31 - ISM, 6.09 ļļ - GDP. В 3.61 ţţ 7 ļļ ļļ Μ NFP GDP Į 7 - ISM 8:25 ļ ţ ļ 9:55 . T \_ Į ļ ł ĮĮ Т 1, 1.99 ĮĮ ł Ì 0.69 ţţ - 11 Į. 0

Т 1 ļ ł ļ ļļ ₿. I ļ -

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F I - II - 1
- <b>i ii</b> FOMC - 27.14
FOMC
$FOMC$ $\frac{16}{16}$ $  I$ $ -$
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-   <b>š š</b>

<sup>&</sup>lt;sup>16</sup> O Į FOMC 🖌 (2015) ∮. F−∮, ł Μ Ł 4 ł (2015), 24-Т Μ ţ 2 4 -1 . S L. Μ (2015) \$-2011 - FOMC -∽ <u></u>, ş ş., § 2008. ţ -

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G.X. Hu, J. Pan, J. Wang et al.

Journal

#### Table 2

P--A R - §.

	М -	А	ş	AD §
	A 4	E FOMC	FOMC	( \$ \$)
P. A: P			-	( \$\$ \$)
1994 2000	16.00	9.60	35.81	6.95
	4.22	2.17	5.55	2.62
2001 2011	14.87	10.88	35.55	0.78
	4.58	3.16	4.27	0.30
2012 2018	7.02	6.98	3.96	5.14
	2.54	2.27	0.74	2.62
1994-2018	12.86	9.48	27.14	3.61
	6.49	4.40	5.95	2.39
Panel B: Pre-	announc	ement retur	n per yea	ar (in percent)
1994 2000	7.04	3.46	2.86	17.51
2001 2011	6.54	3.92	2.84	1.97
2012 2018	3.09	2.51	0.32	12.95
1994-2018	5.66	3.41	2.17	9.10
# 1/-	44	36	8	252

ļ NFP, ISM, GDP Į -1. 8A 4-FOMC, SE FOMC-FOMC --. I P A. ų ļļ t-**J**) . Т Į I ( . I P. B, 5% ļ -. 8A D Į Į S&P 500 Į - Į. z -

-FOMC Į - ŗ 2012 ξ. Ι 2018, 6.98 -FOMC ţţ Į Į § -3.96 FOMC ş II Į. А ļ

Ļ - -- 1 ł Į В Ì A₽ Ρ - 44 7 5.66% 9.10%. S ł GDP), FOMC -FOMC ( . ., NFP, IMS -- ₹ 3.41% -FOMC, 2.17% - FOMC. F-FOMC 🕹 -1 ļ , Į Į, ļ ļ . T **J** 2011, §. F FOMC 0.32% -- [ ţţ 2.51% ~. А 🖌 Ļ ļ 1.97% Į



#### 4.2. Return-to-variance ratios

ΑĻ P--2 Į Į - Į - Į (..., ļļ A Ł 4 ł 55 ļ A§ -T 3, ł ţ ł \_ Į - I 12.86 ţ ţ 0.36 ł ĮĮ Ł -35.53 ļ t-L 5.27. T Į ş ļ ļ \$ (2.89 ţţ ş -) (0.28 ĮĮ ş - --). 10.29 ĮĮ ļ ţ . T Z -\$ \$ 25.23 --Ì . ļ 1% ļļ . T Į. Į Į FOMC 🛓 -FOMC -J. T 3 ţ ļ I II 1 - 1 ļ 1994 -2000, 2001 2011, 2012 2018.

<sup>&</sup>lt;sup>19</sup> I 🖌 ş **ξ**. Τ ţ ş. -4:00 -⊓ **j** 3:30 ş -J. 0 - - J ţ S ş --А 0 А .

		D			DI_A		D- D-	
	(4	(4 - 5 )		( - 5 + 55		+ 55 )	1 -1 9	
	R (\$)	V ~ ( })	R /V -	R ( 1)	V ~ ( \$)	R /V ~	R /V -	
All 4 Macro	12.86	0.36	35.53	2.89	0.28	10.29	25.23	
	6.49		5.27	1.66		1.65	2.75	
Ex FOMC	9.15	0.35	26.38	2.03	0.24	8.56	17.82	
	4.20		3.49	1.13		1.12	1.66	
FOMC Only	27.14	0.40	68.58	6.19	0.45	13.82	54.75	
	5.95		5.41	1.28		1.28	3.28	
Subperiods for	or All 4 M	lacro						
1994 2000	16.00	0.28	56.73	4.48	0.38	11.84	44.89	
	4.22		3.71	1.02		1.00	2.33	
2001 2010	15.22	0.47	32.27	1.83	0.32	5.70	26.57	
	4.54		3.52	0.66		0.66	3.43	
2011 2018	7.63	0.26	29.22	3.32	0.16	6.52	20.21	
	2.62		2.46	1.44		1.40	1.61	

<b>Γable 4</b> Μ ∮ ∽ R ∮	I U		PA	(	C. 4 V	VI.			
	A 4 M -			E FOMC			FOMC O		
	Н	L	H - L	Н	L	H - L	Н	L	H - L
P. A: R - J. Pre-Announcement	∆VI,S∽ Period	PA		$\Delta VI$					
R	85.97	0.17	85.80	81.22	-8.70	89.92	100.39	9.23	91.16
	12.05	0.05	11.69	10.35	-1.73	8.26	8.50	2.48	9.60
ΔVI ( <b>ξ</b> )	-1.32	0.31	-1.63	-1.07	0.46	-1.53	-1.57	0.11	-1.68
()	-16.98	6.27	-15.53	-9.77	5.86	-9.14	-14.05	1.96	-13.41
Post-Announcement	t Period								
R	0.34	5.80	-5.46	11.15	1.35	9.80	-5.87	9.19	-15.06
	0.05	1.89	-0.80	1.72	0.43	1.38	-0.56	1.67	-1.22
$\Delta VI$	-0.20	-0.22	0.02	-0.11	-0.07	-0.04	-0.32	-0.39	0.07
	-2.20	-5.76	0.22	-1.00	-1.53	-0.37	-1.89	-6.43	0.49
	1	All 4 Macro			Ex FOMC			FOMC Only	,
	Н	L	H - L	Н	L	H - L	Н	L	H - L
	$(\Delta VI)$	$(\Delta VI)$	$(\Delta VI)$	$(\Delta VI)$	$(\Delta VI)$	$(\Delta VI)$	$(\Delta VI)$	$(\Delta VI)$	$(\Delta VI)$
Panel B: Pre-Annou	ncement Re	turns, Doub	le-Sorted b	y Pre-Anno	uncement	ΔVI	∆Vol		
H $(\Delta V)$	102.71	-7.72	110.43	72.33	-19.53	91.86	126.71	28.14	98.57
	7.17	-0.58	5.53	6.18	-1.14	2.96	4.35	2.38	3.64
L $(\Delta V)$	79.54	1.14	78.40	84.18	-6.18	90.36	89.45	6.75	82.70
	10.14	0.35	9.21	8.64	-1.30	8.18	7.48	1.49	7.14
H-L ( $\Delta V$ )	23.16	-8.86		-11.86	-13.35		37.26	21.39	
	1.53	-0.92		-0.65	-1.04		1.38	1.82	
A	ş -		$\Delta VI$	8H -	8L ~	P. A,	, P	В, -	
$\Delta VI$ $\Delta V$ , -	VĿ	z,	ţ.	ļ			<b>ј.</b> Т	- <u>i</u> - <u>i</u>	
, 8H	<b>~</b>   .		ş -	1	20% VI	-	8L ~		∽∳;8H
(ΔV)-		ş –	20%	V -	81	(ΔV)-		- J. 8	A 4 M
§ NFP, ISM, GDP	FOMC,	&E FON	ال مـ10	FOMC -	N	I -} .	- 1	5	% -
. Т 🕴 –	1 - S	- 199	4 M 20	18.					

 $\frac{1}{2} - \frac{1}{2} - \frac{1}$ 



ş. -----VI C Fig. 3. A 😁 С R Н М -D & M ~ -- j L U -Α (NFP, ISM, ş. --GDP, FOMC) ş - $\Delta VI$ ļ, 8H ~ -1 -20% VI -- J. D 0 🖌 . R -9:30 4 -\$ -8L Т ļ ļ 95% M 2018. ţ I S - 1994 Т

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      Image: Second second
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Fig. 4. D 5 -(NFP, ISM, GDP, FOMC) Р 🖌 -А R - , **↓** C RŞ U М ş ţ  $\Delta VI$ 8H 5 -20% VI - J. T - ţ), **ļ** ( ļ şţ <u>ا</u> 81. I **§** ( ļ. ( ţ **J**) I I

v A Т 4 20% VI \$ 1.32%, В Ĩ 0.31% VI Т ł F С Т ł P Į В 5

∽ <u></u>. C VI ĮĮ Ц **↓** 0.92 В <u>] |</u> ļļ **4.09** -3.64. F ļļ 5 , T -3.17 -2.53. T Ļ t-

A₿ ş-₿. C ţţ ų J, 2.88 4.64, 🛓 \_ Į 0.92 (t-§ =1.66) Ī Į, Ī ļ 4.09 VI ж ļ 5.94 ş Į ļ <u></u> -55 B **§** 0.34 ţţ 0.04 A ł ļ Į

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Table 5 M ∮ P∮-A R ¬∮

## Table 6

M 🖌 –	Н	U	-	U	Α	-P ~	$\Delta VI$
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		A 4 M ~			E FOMC		FOMC O			
	Н	L	H-L	Н	L	H-L	Н	L	H-L	
A P ~										
R	-254.73	83.69	-338.42	-247.05	80.19	-327.24	-283.59	95.32	-378.91	
	-15.41	12.13	-21.07	-13.29	10.56	-18.38	-7.31	5.82	-9.95	
∆VI (∮ ~ , ~)	4.29	<b>-0.80</b>	5.09	4.10	<b>-0.85</b>	4.95	5.15	<b>-0.56</b>	5.71	
	20.21	-10.54	27.54	18.67	-9.86	24.19	8.51	-3.61	13.27	
РА Р	-									
R	21.89	10.47	11.42	16.95	7.09	9.86	43.65	23.01	20.64	
	4.05	5.11	2.35	2.89	3.12	1.84	3.33	4.96	1.82	
$\Delta VI$	<b>-0.32</b>	0.05	<b>-0.38</b>	-0.12	0.23	-0.34	<b>-0.60</b>	-0.12	<b>-0.48</b>	
	-2.10	1.00	-2.86	-0.62	2.63	-1.74	-2.53	-2.04	-2.82	
P∮-A P	-									
R	-1.12	3.95	-5.07	-0.33	2.66	-2.99	-3.09	8.51	-11.60	
	-0.25	2.11	-1.18	-0.07	1.39	-0.67	-0.26	1.60	-0.96	
$\Delta VI$	-0.13	<b>-0.24</b>	0.11	0.09	-0.12	0.21	-0.39	<b>-0.37</b>	-0.02	
	-1.35	-6.55	1.26	0.65	-3.19	2.06	-2.68	-5.82	-0.13	

8H § 20% - § VI  $(\Delta VI)$ ţ - -FOMC -8L §. &A 4 M SNFP, ISM, GDP, FOMC, & FOMC *~*. Т ţ S - 1994 M 2018.

ţţ -<u></u>, Į Į -- **j** (NFP, FOMC).22 ISM, GDP

F -ļ ł Į VI . Uļ  $\Delta VI$ ļ 4.29 ļļ -255 VI . F ţţ ļ ₿, VI 0.80 Ĩ -\_ § 84 Ş. 55 Į S  $\Delta VI$ ļ ļ VI , F

ļ ł ş A₿₿ 5 ţţ T \$ 21.89 6 ţţ 10.47 Ł ł С ļ 5 ł ι. Α ι ļļ - 1 . Al l Ţ VI 6, -0.32ł Ì 0.05 -Į ļ

6 ļļ ł  $\Delta VI$ \_ ļ Ł.

F Ł Т 1.12 ļ ļ, 3.95 ĮĮ ļ Ş. Т -\_ ļ \_ Į Į VI ł Т -VI Į,

I Ì ļļ 6 -<u>I</u>, T Į ļ ļ 🐇 (NFP, ISM, GDP) FOMC . 0 ļļ ł S

Т ΔVI ş 7. C ĮĮ 5 ł T ł  $\Delta VI$ Ł. VI 3.40 Т **J** 3.13%. ļļ ļļ Ì ł <u>]</u> z

<sup>&</sup>lt;sup>22</sup> U ţţ ş , ş --ţ, 80 ţ \_ ~ NFP, 93 - ISM, 77 - GDP, 51 - FOMC. I ş - } } ţ ļ 5 ş --1 ş ş - ş ş.

#### Table 7 -Ρ- ΔVI. P P~ -A R 🗂 💺 A A 4 M ~ E FOMC FOMC O R $\Delta VI$ R $\Delta VI$ R $\Delta VI$ C § 12.86\*\*\* -0.03 9.15\*\*\* 0.14\* 27.14\*\*\* -0.22\*\*\* -0.676.59 4.28 1.91 5.98 -3.25 $\Delta VI$ -6, -1 3.40\*\*\* -0.10\*\*\* 3.51\*\* -0.12\*\* 2.48\* -0.062.79 -2.792.34 -2.481.71 -1.51A \* R-S ~ (%) 3.13 7.82 3.38 10.57 1.16 4.17 0 🖌 922 392 732 204 190 188 R - 1 ţ VI .... ų VI .T - - 👪 ş 1 ş - **j** $\Delta VI$ . R ļļ ţ $\Delta VI$ 8A М -§ NFP, ISM, GDP, FOMC, SE FOMC 4 -



Fig. 5. VI , V (V\_V), , R (V ) T VV, -} ļ V ν . I - 1 E-S&P 500 ţ 5 ş ţ  $\sqrt{252 \times 23 \times (60/5)}.$ νν ş ţ 7 4 . T z (V) § z S&P 500 E-9:30 4:00 Ł - 1 **!** (78 -- 1

FOMC O

Table 8 M	R 🖁	I,	U	-	ţ	PA		C	∮ V	ν.	
				A 4 M	-			I	E FOMC		
		ц		т		цι	ы		т	υι	ц

	Н	L	H - L	Н	L	H - L	Н	L	H - L
P. A: R - 1	ΔV V, S ~	P~ -A		ΔVI					
ΔVI (§)	<b>-1.32</b>	0.31	<b>-1.63</b>	<b>-1.07</b>	0.46	-1.53	-1.57	0.11	-1.68
	-16.98	6.27	-15.53	-9.77	5.86	-9.14	-14.05	1.96	-13.41
R	85.97	0.17	85.80	81.22	-8.70	89.92	100.39	9.23	91.16
	12.05	0.05	11.69	10.35	-1.73	8.26	8.50	2.48	9.60
$\Delta V V$	-2.34	-0.59	-1.75	3.39	0.03	3.36	-5.11	-2.44	<b>-2.67</b>
	-2.60	-1.14	-1.57	1.50	0.04	1.85	-4.53	-5.89	-2.70
P B: R 5	ΔVI ,S -	PA		$\Delta V V$					
∆V V (∮ ~	<b>-8.66</b>	1.69	-10.35	- <b>7.90</b>	2.27	-10.17	<b>-10.59</b>	<b>-1.09</b>	<b>-9.50</b>
	-16.04	6.89	-18.47	-12.08	7.80	-15.22	-14.52	-3.63	-13.52
R	27.43	10.27	17.16	14.00	9.18	4.81	52.17	22.97	29.19
	5.28	4.61	3.33	2.80	3.67	0.86	3.66	4.35	2.29
$\Delta VI$	<b>-0.20</b>	0.05	<b>-0.25</b>	0.30	0.12	0.18	-0.63	-0.14	<b>-0.49</b>
	-1.78	0.80	-1.99	2.10	1.26	0.98	-2.73	-1.76	-2.57

А  $\Delta VI$ 8H  $\Delta VOV$ , (v z Į --. 8H -§ NFP, ISM, GDP, FOMC, SE FOMC 8A 4 M - -.T 🛔 ş -S - 1994 M 2018.

ļ. J. J ş 1% Ţ 8 Į ΔV V  $\Delta VI$ Ì 4. P ţ ł А VI I ţ  $\Delta V$  V. F --V V § 2.34% 5.11% -1 FOMC -Į Ş. ţ 1% F ļ FOMC -Į 3.39% ļ Į VV. Į. ţ 0  $\Delta VI$ ΔV v 1 Į,  $\Delta VI$  $\Delta V V$ 

P В ş ν ł v S v v 20% ł V . A 🛓 В Р 8, \$ 27.43 Į, Į § 10.27 ι. Τ - FOMC Į Į -FOMC -**↓**. S , VI ł ş --FOMC V V, -J. F -

FOMC , -1 VI **-** - | | § 0.20 0.63 Ş, t-§ § -1.78-2.73, - 🖌 -FOMC ∽J, VI -Į 0.30 ţ ļ t-§ 2.10. ĮĮ 0 V V ļ ł . C VI v V -FOMC V V . T -V.

Variance risk premium G VI Į VI . (2009), . F В z ş \_ļ 7 E-S&P 500 -9:30 Į 4:00 (78 5-) Į – 22ţ (VRP<sub>22D</sub>) . ţ VI \_ Z Т . 5 F -ţ ş ţ Ι Į Į

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<b>Table 9</b> P∽ R	I	AVI .	AVRP.							
✓ = PA	R ~		A 4 M -			E FOMC			FOMC O	
=		VI	VRP <sub>22D</sub>	VRP <sub>6D</sub>	VI	VRP <sub>22D</sub>	VRP <sub>6D</sub>	VI	VRP <sub>22D</sub>	VRP <sub>6D</sub>
Δ −6, − C ⊨ ↓ . ⊨ A ∹-R2 (%) O ↓	1	3.80*** 3.18 13.80*** 6.80 3.96 862	2.21** 2.58 13.80*** 6.72 1.72 862	0.37 0.56 13.80*** 6.66 0.01 862	4.03*** 2.76 10.36*** 4.75 4.55 698	2.48*** 2.61 10.36*** 4.70 2.35 698	0.66 0.96 10.36*** 4.65 0.30 698	2.41 1.63 28.45*** 5.52 1.01 164	0.40 0.22 28.45*** 5.48 -0.57 164	-2.22 -1.24 28.45*** 5.54 1.66 164
P	VI 9:30 MC, SE	\$ \$ 4:00 FOMC \$ (VRPape	JJ Z VI J FOMO J. T J	22 × \$ z C - \$	∮ VI 22- 78 - 78 - 78 - 78 - 7 5 - 5	VRP	š š š š š š š š 	. VRP - \$ 22 . &A 4 M VI Δ <sup>1</sup> t-\$ \$ \$	22D \$ \$	↓ . VRP <sub>6D</sub> ↓ ↓ NFP, ISM, . T ↓ ↓
. <b>\$</b> VI										

Table 10	S&P 500 I	R -	IR 7	н	VID	I						
$V_{1,n} = V_{1,n+1} \ge C \qquad (n-0)$				VI.	$VI = u^{\eta} > C \qquad (n - 0.15)$				$V_{1} = u^{\eta} > 0$ $(n - 0.30)$			
$v_{1} t - v_{1} t_{t-1} \ge C \qquad (\eta = 0)$			vi (	$v_{1,t} - \mu_{t-1} \ge c \qquad (\eta = 0.15)$				$\eta_{t} - \mu_{t-1} \ge c$ $(\eta = 0.50)$				
C (%)	ND §	$R_{t+1}$	T- <b>\$</b> .	C (%)	ND \$	$R_{t+1}$	<i>T−</i> <b>\$</b> .	C (%)		$R_{t+1}$	T-₿ .	
(70)	(/ . )	( ,		(70)	( )	( •)		(%)	( )	( ,,		
1994–2018				1994–2018				1994–2018				
4.0	3.9	58.91	2.07	4.0	4.1	49.63	1.73	4.0	4.5	65.68	2.29	
3.5	5.4	38.17	1.65	3.5	5.4	51.34	2.19	3.5	5.9	58.18	2.56	
3.0	7.7	42.70	2.46	3.0	7.8	52.92	3.08	3.0	8.5	57.22	3.24	
2.5	11.1	36.58	2.83	2.5	11.1	46.06	3.34	2.5	11.6	34.56	2.50	
2.0	15.9	24.03	2.45	2.0	16.0	29.38	2.80	2.0	16.4	28.30	2.70	
1.5	24.6	19.63	2.68	1.5	24.5	16.64	2.14	1.5	25.4	19.92	2.70	
1.0	39.7	10.34	2.01	1.0	39.3	11.70	2.17	1.0	41.2	11.80	2.23	
0.5	68.0	7.87	2.28	0.5	68.1	7.14	2.02	0.5	68.6	7.24	2.05	
0.0	117.9	3.47	1.46	0.0	116.7	4.33	1.85	0.0	115.3	6.06	2.53	
1986-2018			1986-2018				1986-2018					
4.0	3.6	35.98	1.19	4.0	3.7	36.29	1.18	4.0	4.0	52.64	1.74	
3.5	4.9	22.29	0.95	3.5	4.9	38.67	1.58	3.5	5.3	45.65	1.93	
3.0	6.9	30.55	1.73	3.0	7.0	43.14	2.41	3.0	7.6	48.04	2.71	
2.5	9.8	29.35	2.27	2.5	9.9	39.45	2.86	2.5	10.4	29.45	2.17	
2.0	14.3	16.94	1.78	2.0	14.4	24.51	2.42	2.0	14.9	21.70	2.16	
1.5	22.2	14.22	2.07	1.5	22.2	12.30	1.68	1.5	23.0	15.56	2.23	
1.0	36.5	6.59	1.41	1.0	36.7	8.83	1.82	1.0	38.2	9.71	2.03	
0.5	65.4	4.84	1.62	0.5	65.2	5.33	1.73	0.5	65.7	5.79	1.88	
0.0	118.6	3.03	1.54	0.0	117.7	4.03	2.05	0.0	115.8	5.07	2.51	
R - VI	$\begin{bmatrix} R \\ t+1 \end{bmatrix}$	$t = \mu_{t-1}^{\eta}$	≥ C , VI ~	$\mu_{t-1}^{\eta} = -\eta.$	S&P 500 $(1 - \eta) \sum_{\eta = 0}^{\infty}$ T	$\int_{\tau=0}^{t-1} \eta^{\tau} \text{VI}_{t}$	$\tau = \tau - 1$	VI μ <sub>t-</sub> - 1994 Ι VI	J. D $M = VI_{t-1}$ M = 20 J.59%	t + 1 5 -		

- 1986 M 2018 -.T 5 J VI J 1.59% -J

I - 1986 M 2018. ~ 1994 M 2018 ļ S

Ι ļļ ş . Į ļ ļ А P--6 VI Į., <u></u>.Ε Ì Į Т Į .24 I VI VI Ļ ş Į, ļ VI Ļ ļ ş ļ . F J J VI,

 $\Delta VI_{t} = VI_{t} - VI_{t-1}.$ 

- 1 ₫--- ₫ VI 0 -· · · · 5 M 2018. F -- 1986 Ł J ----1986 -1989, ş & VI -(V 0), ļ -----VI -. Т ļ,

<sup>24</sup> G ş VI, ş - 1 ş ş ş ļļ S -Ł А D 0

- - } ş --S Ì Ļ 1994 M 2018.

ţ

0 -Į. ,  $\Delta VI_t$ ļ ţ ļ Į. 2.16%. T , . - 1 1 ş ş ---1987 🖌 ΔVI t, - § ş --ΙĮ <u>| |</u> - J.J.T. 0 ł - 1987, ΔVI t § 1.51%, ļ, Ļ t-<u></u> ļļ ļ ļ Ł 1 ( 2.77), **\$ \$** 24 ( 6.09). 0 t-§ ł ∆VI t ∮ VI Ł Ļ VI.0ж ł ų Ļ ł ţ ş Ļ ļ VI ş -

ļ А t,

Table 11				
$P = R = \Delta V I$	VI B			
	R -		$\Delta VI$	
$\Delta VI = -6, -1$	2.96***	0.33	-0.07***	-0.02**
	3.60	0.40	-6.87	-2.04
$\Delta VI$ $-6, -1 \times M$ -		5.43**		-0.09**
		1.99		-2.43
$\Delta VI$ -6, -1 $\times$ HVI		6.69*		-0.13**
		1.69		-2.30
M		15.44***		-0.32***
		3.76		-6.17
HVI		13.85		-0.23
		0.63		-0.61
C	3.60**	-0.76	0.00	0.09***
	2.48	-0.46	0.01	3.91
A *i R-S ~(%)	0.64	1.65	2.07	4.08
0 5	5972	5972	5971	5971
D I S&P	500	Į	VI -	11
₿ VI	- 1 -	. 8	4 - N	
~ NFP, ISM, GDP	FOMC		5. 8HVI -	- <b>j</b>
VI	<u> </u>	5		
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	-		$\Delta VI$ . T	t-
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$$E R_{1} = \alpha \lambda_{0} + \frac{\alpha \lambda}{1 - \frac{1}{2} \alpha^{2} \lambda} - \alpha (1 - \delta) E \sigma^{2}$$
$$= \delta \alpha (\lambda_{0} + \lambda) + \frac{\frac{1}{2} \alpha^{3} \lambda^{2}}{1 - \frac{1}{2} \alpha^{2} \lambda} > 0, \qquad (A.2)$$

$$E \sigma^2 = \lambda_0 + \lambda. T \qquad -$$

$$V R_1 = V \sigma \varepsilon_1 - \alpha (1 - \delta) \sigma^2 = E \left[ \sigma \varepsilon_1 - \alpha (1 - \delta) \sigma^{2/2} \right] - \left( E \sigma \varepsilon_1 - \alpha (1 - \delta) \sigma^2 \right)^2$$

$$=\delta(\lambda_0+\lambda)+\alpha^2(1-\delta)^2\lambda^2.$$
 (A.3)

$$E R_2 = E \sigma \varepsilon_2 + \alpha (1 - \delta) \sigma^2 = \alpha (1 - \delta) (\lambda_0 + \lambda) > 0,$$
(A.4)

$$V R_{2} = V \sigma \varepsilon_{2} + \alpha (1 - \delta) \sigma^{2} = E \left( \sigma \varepsilon_{2} + \alpha (1 - \delta) \sigma^{2} \right)^{2}$$
$$- \left( E \sigma \varepsilon_{2} + \alpha (1 - \delta) \sigma^{2} \right)^{2}$$
$$= (1 - \delta) (\lambda_{0} + \lambda) + \alpha^{2} (1 - \delta)^{2} \lambda^{2}, \qquad (A.5)$$

**Deriving Proposition 3** 

$$\frac{\frac{1}{2}\alpha^{3}\lambda^{2}}{1-\frac{1}{2}\alpha^{2}\lambda} > \alpha(\lambda_{0}+\lambda). \tag{A.7}$$

 $-RVR_1 > RVR_2$ . Ν , F-∮,

$$RVR_2 = \frac{\alpha(\lambda_0 + \lambda)}{(\lambda_0 + \lambda) + \alpha^2(1 - \delta)\lambda^2} < \alpha.$$
(A.8)

$$RVR_1 = \frac{\alpha\delta(\lambda_0 + \lambda) + \frac{1}{2}\alpha^3\lambda^2/(1 - \frac{1}{2}\alpha^2\lambda)}{\delta(\lambda_0 + \lambda) + \alpha^2(1 - \delta)^2\lambda^2}.$$
 (A.9)

$$\frac{2^{\alpha} \lambda^{\alpha} (1 - 2^{\alpha} \lambda^{\alpha})}{(\lambda_0 + \lambda) + \alpha^2 \lambda^2} > \alpha.$$
(A.10)

$$\frac{1}{2}\alpha^{3}\lambda^{2}}{1-\frac{1}{2}\alpha^{2}\lambda} - \alpha^{3}\lambda^{2} > \alpha(\lambda_{0} + \lambda).$$
(A.11)

$$\frac{\lambda(\frac{1}{2}\alpha^4\lambda^2-1)}{1-\frac{1}{2}\alpha^2\lambda}>\lambda_0. \tag{A.12}$$

N 
$$\frac{1}{\sqrt{2}} < \lambda < \frac{2}{\alpha^2}$$
 (A.13)

$$- - \frac{1}{2} \frac{1}{2} (4) \cdot T \quad , \quad -\lambda \frac{1}{2} \frac{1}{2}$$

(A.13),

N

$$\frac{\lambda(\frac{1}{2}\alpha^{4}\lambda^{2}-1)}{1-\frac{1}{2}\alpha^{2}\lambda} = \frac{\frac{1}{2}\lambda(\alpha^{2}\lambda+\sqrt{2})(\alpha^{2}\lambda-\sqrt{2})}{1-\frac{1}{2}\alpha^{2}\lambda}$$
$$> \frac{(2/\alpha^{2})(\alpha^{2}\lambda-\sqrt{2})}{1-\frac{1}{2}\alpha^{2}\lambda}.$$
(A.14)

$$T \quad \frac{1}{2}, \quad \frac{1}{2} \quad \frac{1}{2} \quad (A.12) \quad \frac{1}{2}$$

$$\frac{(2/\alpha^2)(\alpha^2\lambda - \sqrt{2})}{1 - \frac{1}{2}\alpha^2\lambda} > \lambda_0, \quad (A.15)$$

$$\lambda > \frac{\sqrt{2}/\alpha^2 + \lambda_0/2}{1 + \alpha^2 \lambda_0/4} = \frac{\sqrt{2}}{\alpha^2} + \frac{\left(2 - \sqrt{2}\right)\lambda_0}{4 + \alpha^2 \lambda_0} \equiv \lambda^*(\lambda_0).$$
(A.16)
$$T \quad \downarrow \quad \downarrow \quad P \quad \downarrow \quad \lambda^*(\lambda_0) \in \left[\sqrt{2}/\alpha^2, 2/\alpha^2\right].$$

### Supplementary material

S	 · •	<u>11</u> 55	<u>,</u>	. 1
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- $\begin{array}{c} M = 1 & , R.C. \ 1973. \ A = 1 & , f =$