CrossM

(2006) . (2012, 2014),

(2010),

(2013),

. (2014)

(2005), . (200), . (2010),

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(1 3).

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(2006) ( )

/ (1 77), . (1 6)

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(2006)

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(*Tbill*) (1 7), (1 2)

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1. Data

(2006)

(2006)

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2

7%,

SENTIMENT.

1 65

2010. (2006)

SENTIMENT

1 7 1 7,
1 2001
PctZero
1 73 1 0 1 1 2,
, *PctZero*

2. Decomposition of the Sentiment Index

$$SENTIMENT_t = a + b'X_t + e_t, \quad (1)$$

X_t [4] e_t
, $\hat{a}$ *and*

Table 2

SENTIMENT$_t$ $a + b'(X_t) +$ $_t$, *SENTIMENT*$_t$ X_t / e_t
SENTHAT *SENTRES* /
( ), ( ), ( ), ( ), ( ),
(*Tbill*), ( ), ( ), ( ), ( ),
( ), (( ), *PctZero*) *p*- ( ),
( ) *t*- *t*- *t*- 100,000
SENTRES, *SENTHAT* *SENTRES* 1 65 2010. *SENTIMENT*, *SENTHAT*,

		p-	*t*-	
Panel A. Regression of Sentiment on risk/business ryc le variables				
13 variables				
	−0.71	0.26	−0. 5	0.00%
	−0.06	0.37	−0.46	0.34%
	−0.12	0.3	−0.76	0.35%
	0.04	0.23	1.03	−0.23%
	−0.01	0.3	−0.4	0.04%
	−0.13	0.05	−2.16	1.10%
	0.17	0.3	0.72	0.7 %
Tbill	0.4	0	4.	3 .4 %
	0.11	0.42	0.27	0. %
	0.4	0.03	3.05	−2.55%
	−0.27	0.2	−0. 5	3.0 %
	−0.01	0.24	−1.01	0.20%
	0	0.41	−0.3	−0.23%
PctZero	−0.06	0.04	−2.	20.13%
				63.52%
				62.56%
2 variables				
	−0.1	−2.64	−0. 6	0.00%
Tbill	0.2	1 .3	5.12	23.3 %
PctZero	−0.06	−17.66	−4.36	17. 0%
				41.35%
				41.03%

			1	*SENTIMENT*	*SENTHAT*	*SENTRES*
Panel B. Summary statistics and correlations of sentiment components						
SENTIMENT	0.00	1.00	0.	1.00		
SENTHAT	0.00	0. 0	0. 6	0. 0	1.00	
SENTRES	0.00	0.60	0. 1	0.60	0.00	1.00

					+1	+1	+1	+1
Panel C. Correlations between SENTHAT and SENTRE with contemporaneous and future Fama and French factors								
SENTHAT$_t$	−0.0	−0.0	0.04	0.02	−0.0	−0.10	0.05	0.02
p-	0.04	0.0	0.3	0.73	0.06	0.02	0.26	0.57
SENTRES$_t$	0.00	−0.04	0.07	−0.01	−0.01	−0.03	0.03	−0.02
p-	0.	0.34	0.0	0. 0	0.7	0.4	0.43	0.63

(*PctZero*) [6]

(2007)

(2003), (2005),
(200) (2011),

(*PctZero*)

PctZero

−0.0 *p*- 6%,
PctZero

13-

2-

[6] 13
PctZero

13

13 2

1.

explanatory power. Given that the SENTHAT (SENTRES) from the 13-variable and 2-variable systems are 97% (95%) correlated, we report our future results using the estimates from the 13-variable system. The results using the 2-variable system are qualitatively similar, and we discuss main results using the 2-variable system in Section 5.

In Panel B of Table 2 we report the summary statistics of the two orthogonal components, SENTHAT and SENTRES. Note that the sentiment index is constructed to have a mean of zero and volatility of one. SENTHAT, by construction, shares the same mean as the dependent variable, and SENTRES, by definition, has a mean of zero. All series remain highly persistent with autocorrelations above 90% for both SENTHAT and SENTRES. Interestingly, we observe that SENTHAT is more strongly related to the sentiment index with a correlation coefficient of 0.80 when compared to the 0.60 correlation between the sentiment index and SENTRES.

We obtain four widely used pricing factors from Kenneth French's website: the market excess return (MKT), the size factor (SMB), the value factor (HML) and the momentum factor (WML). To examine how the two sentiment components are related to Fama and French factors, we report correlations between SENTHAT, SENTRES, and contemporaneous and future Fama and French factors in Panel C of Table 2. SENTHAT is significantly negatively correlated with the contemporaneous and future excess market return with a correlation coefficient of −0.09 (with p-value of 0.04) and −0.08 (with p-value of 0.06), while SENTRES is not significantly correlated with either

Table 3

16 (2006) 12 t- 24 16 (2006) 1 65 (2012). 11 (2012) 1 65 200 2010, 1 72, 1 74.

			t-		t-			t-		t-
	−0.14	−0.03	−0.1	−0.14	−1.17	0. 5	1.37	2.70	0.71	2.75
/	−0.20	−0.0	−0.70	0.00	0.06	0.70	0.	2. 6	0. 7	5.25
/	−0.64	−0.71	− .21	−0.51	− .2	0.	1.13	3. 2	0. 3	3.50
/	−0.17	−0.17	−1.27	−0.0	−0. 3	0.63	0.74	4.21	0.53	3.77
	−0.34	−0.40	−4.66	−0.23	−2. 1	0.42	0.60	3. 7	0.27	1.
/	0.13	0.27	1.71	0.07	0.63	0.5	0.6	2.51	0.47	1.63
/	0.43	0.32	1. 3	0.53	3.76	0.65	0.71	3.7	0.66	3.
	0.1	−0.0	−0.41	−0.05	−0.32	1.56	1.65	7.66	0.3	2.67
	−0.24	−0.34	−3.71	−0.1	−2.	0.40	0.3	1. 2	0.52	3.75
	−0.11	−0.06	−0.67	−0.05	−0.5	0. 6	1.06	4.0	0.55	2.70
/	−0.34	−0.43	−4. 2	−0.2	−5.20	0.75	0. 1	3. 5	0.50	2.61
/	−0.30	−0.27	−4.46	−0.23	−5.2	0.77	0.	5. 4	0.56	6.03
	−0.3	−0.30	−1.4	−0.15	−1.72					
/	0. 5	1.03	6.0	0.	.61					
/	0.64	0.63	7.34	0.6	.26					
/	0.31	0.40	3.24	0.31	4.45					

$$R_t = a + bSENTMENT_{t-1} + u_t. \quad (2)$$

R_t, t. $SENTMENT_{t-1}$ t−1. b

$$R_t = a + bSENTHAT_{t-1} + cSENTRES_{t-1} + u_t, \quad (3)$$

SENTHAT SENTRES

$$R_t = a + bSENTIMENT_{t-1} + c'FACTOR_t + u_t, \quad (4)$$

$$R_t = a + bSENTHAT_{t-1} + cSENTRES_{t-1} + d'FACTOR_t + u_t. \quad (5)$$

(2006) (2012), FACTOR ( ), ( ), ( ), ( ). (1) (3) (2006) (2012), (3), (4), t, t−1, (3), (4), t−1,

$$R_t = a + bSENTHAT_{t-1} + cSENTRES_{t-1} + d'FACTOR_{t-1} + u_t. \quad (6)$$

(5) (2), (2014) t- (2012), (2014)

(1) SENTHAT, SENTRES. 100,000 SENTHAT, SENTRES, SENTHAT, SENTRES 100,000 p- p- SENTHAT SENTRES ( ) SENTHAT, SENTRES ( ) SENTHAT p- SENTHAT SENTHAT.

(2006) (2012)

3.3. Predictive regression results on spread portfolios

4 (2), (4). 4, (2006) 1 2 SENTHAT 16

Table 4

SENTHAT, *SENTRES*. *SENTHAT*, *SENTRES* $R_{i,t}$ $a + bSENTHAT_{t-1} + cSENTRES_{t-1} + u_t$, $R_{i,t}$ $a + bSENTHAT_{t-1} + cSENTRES_{t-1} + dMKT_t + eSMB_t + fHML_t + gWML_t +$ u_t. $R_{i,t}$ t , *SENTHAT* $t-1$ *SENTIMENT*$_\perp$ / *SENTRES* *SENTIMENT*$_\perp$ $t-1$. 16 (2006) ( ), 12 (2012) *SENTHAT*, *SENTRES*, p- (.)

	SENTIMENT		*SENTHAT*		*SENTRES*		*SENTIMENT*		*SENTHAT*		*SENTRES*	
Panel A. Predicting spread portfolio returns at t												
	0.52	0.01	0.62	0.01	0.36	0.13	0.23	0.06	0.24	0.05	0.1	0.14
/	0.37	0.01	0.56	0.00	0.04	0.43	0.20	0.06	0.31	0.00	−0.04	0.3
/	−0.16	0.04	−0.10	0.15	−0.26	0.02	−0.10	0.23	0.00	0.4	−0.20	0.03
/	0.3	0.02	0.4	0.01	0.24	0.16	0.25	0.03	0.35	0.02	0.21	0.16
	−0.07	0.24	−0.01	0.46	−0.17	0.13	−0.06	0.30	0.06	0.32	−0.12	0.20
/	0.3	0.03	0.41	0.03	0.35	0.12	0.14	0.16	0.04	0.41	0.1	0.16
/	−0.23	0.13	−0.21	0.1	−0.26	0.1	−0.03	0.44	0.03	0.44	−0.11	0.33
	−0. 3	0.00	−1.06	0.00	−0.41	0.17	−0.36	0.02	−0.4	0.01	−0.22	0.20
	−0.3	0.00	−0.43	0.00	−0.2	0.05	−0.24	0.01	−0.22	0.01	−0.20	0.04
	0.31	0.01	0.42	0.00	0.12	0.26	0.1	0.06	0.2	0.02	0.0	0.32
/	−0.34	0.00	−0.41	0.00	−0.23	0.0	−0.20	0.03	−0.21	0.01	−0.16	0.06
/	0.1	0.01	0.30	0.00	−0.03	0.40	0.10	0.12	0.21	0.00	−0.05	0.2
	0.4	0.04	0.6	0.01	0.14	0.34	0.36	0.15	0.5	0.03	0.15	0.34
/	0.13	0.21	0.02	0.46	0.31	0.15	0.11	0.2	−0.01	0.4	0.23	0.1
/	−0.14	0.0	−0.27	0.01	0.0	0.2	−0.0	0.2	−0.1	0.06	0.07	0.31
/	0.27	0.03	0.30	0.04	0.22	0.16	0.1	0.10	0.1	0.12	0.16	0.21
	1.24	0.03	1.23	0.03	1.26	0.06	0. 5	0.06	0.55	0.17	1.53	0.01
	0.73	0.04	0.66	0.07	0. 4	0.04	0.56	0.02	0.35	0.0	1.12	0.00
	0. 4	0.01	0.71	0.03	1.21	0.01	0.71	0.03	0.46	0.11	1.32	0.00
	0.50	0.02	0.40	0.06	0.65	0.02	0.42	0.04	0.25	0.15	0.56	0.02
	0.42	0.03	0.3	0.06	0.4	0.05	0.26	0.0	0.15	0.20	0.35	0.06
	0.34	0.20	0.32	0.22	0.3	0.20	0.23	0.34	0.20	0.31	0.30	0.25
	0.50	0.03	0.73	0.00	0.0	0.3	0.46	0.06	0.63	0.01	0.05	0.44
	0.23	0.16	0.2	0.17	0.15	0.36	0.1	0.23	0.21	0.24	0.13	0.37
	0.36	0.07	0.26	0.17	0.52	0.05	0.45	0.05	0.26	0.17	0.56	0.04
	0.36	0.17	0.40	0.16	0.31	0.24	0.34	0.1	0.41	0.10	0.24	0.24
	0.05	0.42	0.13	0.33	−0.07	0.41	−0.04	0.43	0.11	0.33	−0.13	0.33
	0.45	0.01	0.46	0.02	0.42	0.05	0.33	0.07	0.2	0.0	0.33	0.07

	SENTIMENT		*SENTHAT*		*SENTRES*		*SENTIMENT*		*SENTHAT*		*SENTRES*	
Panel B. Predicting short portfolio returns at t												
	−0. 6	0.01	−1.10	0.01	−0.25	0.33	−0.20	0.05	−0.22	0.05	−0.04	0.40
/	−0.53	0.03	−0.7	0.01	0.0	0.42	−0.06	0.2	−0.13	0.14	0.20	0.0
/	−0.61	0.03	−0.	0.01	0.06	0.45	−0.03	0.40	−0.15	0.16	0.20	0.11
/	−0. 7	0.01	−1.15	0.00	−0.20	0.36	−0.22	0.05	−0.32	0.02	−0.02	0.47
	−0.71	0.02	−0.	0.01	−0.07	0.45	−0.11	0.20	−0.22	0.10	0.0	0.32
/	−0. 0	0.01	−1.15	0.01	−0.30	0.30	−0.21	0.05	−0.21	0.07	−0.06	0.35
/	−0.6	0.02	−0.	0.01	0.02	0.4	−0.14	0.24	−0.26	0.07	0.15	0.22
	−0.13	0.26	−0.17	0.25	0.11	0.37	0.13	0.15	0.20	0.07	0.16	0.17
	−0.41	0.06	−0.57	0.03	0.05	0.45	0.07	0.23	0.06	0.26	0.16	0.07
	−0.71	0.02	−0.	0.01	−0.07	0.45	−0.11	0.20	−0.22	0.10	0.0	0.32
/	−0.42	0.07	−0.5	0.03	0.03	0.47	0.07	0.30	0.06	0.31	0.15	0.12
/	−0.61	0.03	−0.	0.01	0.06	0.45	−0.03	0.40	−0.15	0.16	0.20	0.11
	−0.75	0.01	−1.00	0.01	−0.16	0.3	−0.32	0.1	−0.44	0.0	−0.0	0.41
/	−0.74	0.01	−0. 1	0.01	−0.27	0.30	−0.14	0.10	−0.11	0.17	−0.04	0.3
/	−0.47	0.05	−0.61	0.03	−0.05	0.46	0.05	0.33	0.07	0.2	0.12	0.21
/	−0.74	0.01	−0. 1	0.01	−0.27	0.30	−0.14	0.10	−0.11	0.17	−0.04	0.3
	−1.73	0.01	−1.	0.01	−1.0	0.14	−0. 7	0.03	−0.73	0.06	−1.53	0.00
	−0. 5	0.03	−0.	0.04	−0. 2	0.14	−0.52	0.02	−0.42	0.07	−1.03	0.00
	−0. 7	0.02	−0. 5	0.05	−1.03	0.0	−0.56	0.05	−0.41	0.13	−1.15	0.01
	−0.76	0.01	−0. 1	0.02	−0.6	0.0	−0.42	0.01	−0.40	0.02	−0.46	0.02
	−0.62	0.03	−0.77	0.02	−0.37	0.22	−0.23	0.07	−0.34	0.03	−0.15	0.23
	−0. 4	0.02	−1.01	0.02	−0.54	0.20	−0.27	0.1	−0.3	0.0	−0.17	0.2
	−0.77	0.01	−0. 4	0.01	−0.4	0.16	−0.37	0.05	−0.47	0.02	−0.24	0.17
	−0.	0.01	−1.11	0.01	−0.52	0.21	−0.24	0.14	−0.42	0.07	−0.16	0.32
	−0.51	0.04	−0.3	0.12	−0.72	0.05	−0.25	0.07	−0.0	0.33	−0.56	0.01
	−0. 3	0.01	−0. 7	0.01	−0.5	0.14	−0.40	0.02	−0.47	0.01	−0.30	0.0
	−0.70	0.01	−0. 7	0.01	−0.42	0.1	−0.25	0.13	−0.3	0.06	−0.16	0.27
	−0. 3	0.01	−0. 4	0.01	−0.65	0.11	−0.34	0.02	−0.3	0.02	−0.35	0.04

(*continued on next page*)

2 *p*-

5%. *SENTRES*

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(2006)

4

SENTHAT *SENTRES*

(2006)

SENTHAT, *SENTRES*.

(2006) *SENTHAT*

(2006) 2001

2010, 16 (2006)

SENTRES, *SENTHAT*

(2006).[7]

12 (2012)

SENTHAT 4 12

SENTRES

SENTHAT

(200)

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SENTHAT

SENTHAT *SENTHAT*

4

(4) *t*

SENTHAT

SENTHAT 2

SENTHAT

SENTRES 5.

(2006)

3.4. Predictive regression results on long and short portfolios

4. The fundamentals index

4.1, 4.2,

Table 5

13
13

	1	1	2	2
Panel A. Summary statistics for the fundamentals indices				
		25.62%		17.47%
	0.06	0.01%	0.60	3.26%
	0.35	0.01%	−0.26	0.03%
	0.26	0.03%	0.01	0.00%
	0.20	0.03%	−0.02	0.00%
	0.13	0.01%	0.05	0.01%
	−0.11	0.00%	−0.05	0.00%
	0.45	0.04%	−0.04	0.00%
	−0.01	0.00%	0.47	1.70%
	−0.1	0.04%	0.51	1.00%
	0.45	5.01%	0.1	3.13%
	0.04	0.15%	0.15	6.01%
	−0.2	1 .16%	0.04	1.1 %
PctZero	0.46	2.14%	0.17	1.14%
		p-		*p*-
SENTIMENT	−0.07	0.12	0.04	0.3
SENTIMENT	−0.11	0.01	0.05	0.21

	2		2		2	
	1	2	1	2	1	2
Panel B. Predictive power of the fundamentals indices for future stock returns						
	0	3	0	21	1	23
( ).	0	4	0	1	7	3
	2		2		2	
	1	2	1	2	1	2
Panel C. Horse race between the fundamentals indices and the sentiment index						
	20	0 5	25	0 26	16	3 26
( ).	13	0 3	11	1	3	20 2

4.1. Constructing the fundamentals index

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(0.12).

4.2. Predicting future stock returns

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26 2 2

16 2 1 3

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2)

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5. Robustness checks and further discussion

5.1. The 2-variable System vs. the 13-variable System[10]

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13-

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, PctZero.

2- 6.

2.1, 2-

20% 13-

13- SENTHAT 16 2

26 2

2- SENTHAT 13 2

26 2

2- SENTRES 7

1 SENTHAT

SENTRES,

−1 t t

SENTHAT

SENTHAT SENTRES

2-

13-

11 SENTHAT

5.2. Revisit BW principal component analysis[11]

(2006).

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2.2.

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3 6 0

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3.

5.3. Alternative sentiment index: the Michigan consumer sentiment index

(2006)

[10]

[11]

Table 6

t- *SENTHAT*, *SENTRES* 2- 2 *PctZero*

	2		2		2	
	SENTHAT	*SENTRES*	*SENTHAT*	*SENTRES*	*SENTHAT*	*SENTRES*
Panel A. Number of significant t-statistics for predicting spread and long/short-leg portfolios, using 13-variable system vs. 2-variable system for decomposition						
4	13	16	3	26	0	17	0
	2	13	7	26	1	20	0

SENTHAT *SENTRES* *4922predictivR2bles*

74%

/ / 5

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5.4. Alternative interest rate and liquidity measures

3- *PctZero*

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1- 10-

20-

(2002)

(2005).

3-

PctZero

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SENTHAT

SENTRES,

5.5. Alternative risk factors

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. (2015)

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2 1 2 0 2

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SENTHAT, *SENTRES*

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, *SENTHAT* *SENTRES*,

, *SENTHAT*

SENTRES . (2015).
. (2015) . *SENTHAT* . *SENTRES*.

6. Conclusion

(2006)

Acknowledgements

( ).

Appendix A. Supplementary data

/ /10.1016/ .2015.10.001.

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61, 1645 16 0.
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2014.
, 2014.
200 .
. 22, 4463 44 2.
., 1 7. . 1 373 3 .
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., 1 43, 661 676.
., 1 . 1, 1 5 227.
, 200 . 63, 2 2 3 .
, 1 6. . 5 , 3 3 403.
, 2010.
., 200 22 (1), 257 2 7.
., 1 . 25, 23 4 .
., 1 3. . 33, 3 56.
., 1 77. . 5, 115 146.
., 1 1. . , 3 5 415.
., 1 44, 1325 1360.
., 2006.
, 2010. . 23, 3401 3436.
, 2013.
., 1 2. . 5, 257 2 6.
, 2015. . 2 , 650 705.
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