Internet Appendix:

Does Mood Affect Trading Behavior?

June 2, 2015

Appendix 1

Mood and stock returns

Mood and stock returns. This table reports coefficient estimates from a regression in which daily returns of HEX Portfolio Index (HPYI) are regressed on seasonal affect disorder (SAD) identification and control variables. KKL (2003) is identical specification to Kamstra, Kramer, and Levi (2003). KKL 2007 augmented is as in the original KKL 2007, but with Monday and tax-dummies replacing January dummy in original KKL 2007 specification. Furthermore, only two lagged returns are included as lagged returns from *t*-3 to *t*-5 are not significant. Calendar variables are consistent with earlier KKL 2003 specifications. *Monday-dummy* takes value of 1 for Mondays, *tax-dummy* indicates turn of the year (1 for final trading day of the year or five first trading days, 0 otherwise), *SAD-measure* is a measure for length of night (number of hours between sunset and sunrise in Helsinki – 12 during fall and winter, 0 otherwise) consistent with KKL (2003), *fall-dummy* marks fall season (1 if the trading day is between September 21 and December 20, inclusive), and o*nset/recovery* variable measures onset and recovery of SAD symptoms and is defined in KKL (2007). Environmental variables are also consistent with earlier literature: *precipitation* (in millimeters), and temperature (in degrees Celcius). The data are from 02/10/1970-12/31/2002. To retain consistency with KKL (2003) and KKL (2007), none of environmental variables are demeaned. *t*-values are reported in parentheses. All coefficients are multiplied by 100 below. Panel A reports results for years 1979-1998 using data before sample period and during first half of sample period (1995-1998), excluding data from high stock market volatility years of 1999-2002. Panel B uses data from 1970-2002. Panel C reports results for sample years (1995-2002) only.

Panel A: 1970-1998				
	(1) KKL 2003		(2) KKL 2007 augmented	
	Coefficient	*t*-value	Coefficient	*t*-value
Constant	0.057	(1.99)	0.08	(3.62)
HPYI Return at t-1	21.94	(18.39)	21.99	(18.44)
HPYI Return at t-2	-3.33	(-2.79)	-3.30	(-2.77)
Monday-dummy	-0.049	(-2.27)	-0.05	(-2.27)
Tax-dummy	0.12	(2.14)	0.17	(3.16)
SAD-measure	0.005	(2.30)		
Fall-dummy	-0.071	(-2.74)		
Onset/recovery			-0.08	(-2.02)
Cloud cover, %	-0.060	(-2.10)		
Precipitation, mm	0.001	(0.25)		
Temperature, ^{o}C	0.000	(0.04)		
F-statistic	42.99		47.67	
Adjusted R^2	0.051		0.051	
Number of observations	7,035		7,035	

Panel B: 1970-2002				
	(1) KKL 2003		(2) KKL 2007 augmented	
	Coefficient	*t*-value	Coefficient	*t*-value
Constant	0.047	(1.43)	0.07	(2.63)
HPYI Return at t-1	15.80	(13.94)	15.81	(13.95)
HPYI Return at t-2	-2.10	(-1.86)	-2.12	(-1.87)
Monday-dummy	-0.045	(-1.86)	-0.04	(-1.85)
Tax-dummy	0.16	(2.46)	0.19	(3.12)
SAD-measure	0.004	(1.54)		
Fall-dummy	-0.042	(-1.41)		
Onset/recovery			-0.07	(-1.43)
Cloud cover, %	-0.036	(-1.10)		
Precipitation, mm	0.002	(0.70)		
Temperature, ^{o}C	-0.001	(-0.81)		
F-statistic	25.43		28.54	
Adjusted R^2	0.0282		0.028	
Number of observations	7,887		7,887	

Panel C: 1995-2002				
	(1) KKL 2003		(2) KKL 2007 augmented	
	Coefficient	*t*-value	Coefficient	*t*-value
Constant	0.15	(1.19)	0.08	(0.86)
HPYI Return at t-1	8.07	(3.43)	8.06	(3.43)
HPYI Return at t-2	-1.99	(-0.85)	-2.01	(-0.86)
Monday-dummy	0.046	(0.56)	0.04	(0.55)
Tax-dummy	0.33	(1.45)	0.31	(1.39)
SAD-measure	-0.005	(-0.64)		
Fall-dummy	0.037	(0.35)		
Onset/recovery			-0.10	(-0.59)
Cloud cover, %	-0.014	(-0.11)		
Precipitation, mm	0.003	(0.24)		
Temperature, ^{o}C	-0.011	(-1.93)		
F-statistic	2.46		2.76	
Adjusted R^2	0.0071		0.008	
Number of observations	1,850		1,850	

Appendix 2

Using raw buy ratio as dependent variable

Table 5

Raw buy ratio: Cross-sectional regressions for SAD and Sunniness

Results for the binomial *z*-test for the impact of amount of *Sunniness* (from 1 to 10) and *Length of day* (the number of hours between sunrise and sunset) on the investor group. The unit of observation is municipality and day/week. The dependent variable buy ratio (# of buys (# of buys + # of sells)) is regressed on *Sunniness* or *Length of day* and a constant. The *z*-test statistic is computed with the binomial test as (% of positive coefficients when regressing excess buy ratio on *Sunniness* or *Length of day* for each municipality –50%) / (0.5*0.5/Number of observations in the regression)$^{0.5}$. The sample period runs from January 1, 1995 through November 28, 2002. *, **, and *** denote significance (2-tailed) at 10%, 5%, and 1% levels, respectively.

Panel A: Weekly regressions with raw buy ratio as dependent variable

		Individual	Nonfinancial corporation	Financial corporation
Sunniness	# of regressions during weeks 1-53	403	403	403
	% of positive coefficients	198	216	198
		49 %	54 %	49 %
	z-test	*-0.35*	*1.44*	*-0.35*
	total # of municipality/week observations			
Length of day	# of regressions during weeks 1-53 ex 12-14 and 38-40	356	356	356
	% of positive coefficients	193	166	180
		54 %	47 %	51 %
	z-test	*1.59*	*-1.27*	*0.21*
	total # of municipality/week observations			

Panel B: Daily regressions with raw buy ratio as dependent variable

		Individual	Nonfinancial corporation	Financial corporation
Sunniness	# of regressions during weeks 1-53	1918	1918	1412
	% of positive coefficients	927	999	730
		48 %	52 %	52 %
	z-test			
	total # of municipality/week observations	*-1.46*	*1.83*	*1.28*
			*	
Length of day	# of regressions during weeks 1-53 ex 12-14 and 38-40	1697	1697	1579
	% of positive coefficients	831	846	798
		49 %	50 %	51 %
	z-test			
	total # of municipality/week observations	*-0.85*	*-0.12*	*0.43*

Appendix 3

Using trading volume as dependent variable

Table 3

Trading volume: Panel regressions for weather-related mood variables and calendar effects

The depended variable is (zero skewness) *ln* number of trades. The base sample includes all trades by domestic investors in all Finnish stocks during the sample period of 1995-2002. There is one observation for each municipality/day combination and the sample is divided into domestic individuals, nonfinancial corporations, and financial corporations. To enter the sample, the municipality must have at least 5 trades by the investor group on the given day and be in the sample of 444 municipalities (10 municipalities are excluded due to merger, other missing municipalities are due to having fewer than 5 trades). *Sunniness* takes the value of 1 for days when sky cannot be observed and 10 for clear sky. *Last 5 trading days of the year*, *First 5 five trading days of the year*, *Monday or after holiday*, *Friday or before holiday*, and *Last 3 and 1st trading of* month are self-explanatory calendar dummy variables. *Temperature* (Celsius) and *Precipitation* (millimeters) are demeaned by subtracting the municipality's average for that week of the year. *Vacation* is a dummy indicating if 1st to 9th grade primary schools were closed in the municipality on the trading day. All specifications include municipality and month fixed effects as well as a constant term, and they are estimated with OLS. Absolute values of standard errors clustered at the daily level are reported below coefficients. Adjusted R-squared figures are reported for three different models: using only municipality fixed effects (*Muni FE Only*) on the same sample as the reported specification, using municipality and each month-fixed effects (*Muni and time FE*), and for the full model for which the coefficients are shown in the table (*Full model*). *Increase, pp.* gives the improvement in the adjusted R-squared in percentage points when going from *Muni and time FE* to *Full model*. *Remaining var. explained* gives the adjusted R-squared for the full model after subtracting the sum of squares explained by municipality and month-fixed effects. Asterisks mark statistical significance: *** for 1%, ** for 5%, and * for 10%.

Panel A: Individuals				
ln number of trades as dependent variable	(1)	(2)	(3)	(4)
Sunniness	-0.0022*	-0.0021	-0.0025*	-0.0042
	0.001	0.001	0.001	0.003
Last 5 days of year	0.0838**	0.0798**	0.0775**	0.0778*
	0.033	0.033	0.037	0.045
First 5 days of year	0.1615***	0.1647***	0.1738***	0.1548***
	0.030	0.031	0.034	0.042
Monday or after holiday	-0.030***	-0.030***	-0.033***	-0.042***
	0.011	0.011	0.012	0.015
Friday or before holiday	0.0257**	0.0254**	0.0255**	0.0229
	0.011	0.011	0.013	0.016
Last 3 and 1st day of m.	-0.0148	-0.0153	-0.0135	-0.0351**
	0.011	0.011	0.012	0.017
Temperature (demeaned)		-0.0017*	-0.0020**	-0.0011
		0.001	0.001	0.002
Vacation			0.0053	
			0.015	
Precipitation (demeaned)				0.0002
				0.001
Number of observations	200,597	200,597	105,925	39,386
Number of municipalities	444	444	236	144
Adj. R-squared for:				
- Muni FE only	0.587	0.587	0.620	0.721
- Muni and time FE	0.760	0.760	0.795	0.844
- Full model	0.761	0.761	0.796	0.845
Increase, pp.	0.001	0.001	0.001	0.001
Remaining var. explained	0.1 %	0.1 %	0.1 %	0.1 %

Panel B: Nonfinancial corporations				
ln number of trades as dependent variable	(1)	(2)	(3)	(4)
Sunniness	-0.0019	-0.0018	-0.0001	-0.005
	0.001	0.001	0.002	0.004
Last 5 days of year	0.0596**	0.0573**	0.0551*	0.0495
	0.026	0.026	0.030	0.038
First 5 days of year	0.0836***	0.0854***	0.0870***	0.0778*
	0.026	0.026	0.032	0.04
Monday or after holiday	-0.070***	-0.070***	-0.069***	-0.091***
	0.009	0.009	0.011	0.015
Friday or before holiday	-0.0099	-0.010	-0.0123	-0.0327**
	0.009	0.009	0.011	0.016
Last 3 and 1st day of m.	-0.0137	-0.0138	-0.0151	-0.0202
	0.010	0.010	0.011	0.019
Temperature (demeaned)		-0.0009	-0.0007	0.0024
		0.001	0.001	0.002
Vacation			-0.0066	
			0.016	
Precipitation (demeaned)				-0.003
				0.002
Number of observations	44,488	44,488	25,259	11,173
Number of municipalities	354	354	191	107
Adj. R-squared for:				
- Muni FE only	0.718	0.718	0.779	0.776
- Muni and time FE	0.775	0.775	0.830	0.848
- Full model	0.776	0.776	0.830	0.849
Increase, pp.	0.001	0.001	0.000	0.001
Remaining var. explained	0.1 %	0.1 %	0.05 %	0.1 %

Panel C: Financial corporations				
ln number of trades as dependent variable	(1)	(2)	(3)	(4)
Sunniness	-0.0042	-0.0041	-0.0039	-0.0039
	0.003	0.003	0.003	0.009
Last 5 days of year	0.0178	0.0174	0.0935	0.0992
	0.063	0.063	0.062	0.093
First 5 days of year	0.1778***	0.1782***	0.1156**	0.1403
	0.058	0.058	0.058	0.101
Monday or after holiday	-0.108***	-0.108***	-0.106***	-0.096***
	0.017	0.017	0.02	0.029
Friday or before holiday	-0.0109	-0.011	-0.0107	0.0089
	0.016	0.016	0.018	0.028
Last 3 and 1st day of m.	-0.0111	-0.0111	0.0227	-0.0444
	0.018	0.018	0.020	0.032
Temperature (demeaned)		-0.0003	-0.0011	-0.0005
		0.002	0.002	0.004
Vacation			-0.0699**	
			0.031	
Precipitation (demeaned)				0.0013
				0.004
Number of observations	6,866	6,866	3,544	2,008
Number of municipalities	174	174	87	52
Adj. R-squared for:				
- Muni FE only	0.895	0.895	0.926	0.924
- Muni and time FE	0.934	0.934	0.965	0.955
- Full model	0.935	0.935	0.965	0.955
Increase, pp.	0.000	0.000	0.000	0.000
Remaining var. explained	0.03 %	0.03 %	0.03 %	0.01 %

Table 4

Excess volume: Descriptive statistics for cross-sectional analysis

Descriptive statistics on the pooled panel data where the unit of observation is municipality with daily and weekly data from January 1, 1995 through November 28, 2002. The data are used in the cross-sectional regressions with results reported in Table 5.

	Min	Mean	Median	Max	St.dev.	Skewness	Kurtosis	N
Individuals								
Excess *ln* (# of trades)	-6.04	0.00	-0.04	3.91	0.58	0.26	3.18	444,704
Nonfinancial corporations								
Excess *ln* (# of trades)	-5.36	0.00	-0.07	3.24	0.57	0.43	3.68	128,718
Financial corporations								
Excess *ln* (# of trades)	-6.84	0.00	-0.08	3.44	0.56	0.33	5.50	20,612

Table 5

Excess volume: Cross-sectional excess volume regressions for SAD and Sunniness

Results for the binomial *z*-test for the impact of amount of *Sunniness* (from 1 to 10) and *Length of day* (the number of hours between sunrise and sunset) on trading volume by investor group. The unit of observation is municipality and day/week. The dependent variable excess *ln* (number of trades) (See Section 5 for exact variable description) is regressed on *Sunniness* or *Length of day* and a constant. The *z*-test statistic is computed with the binomial test as (% of positive coefficients when regressing excess buy ratio on *Sunniness* or *Length of day* for each municipality –50%) / (0.5*0.5/Number of observations in the regression)$^{0.5}$. The sample period runs from January 1, 1995 through November 28, 2002. *, **, and *** denote significance (2-tailed) at 10%, 5%, and 1% levels, respectively.

Panel A: Weekly regressions with excess *ln* (number of trades) as dependent variable

		Individual	Nonfinancial corporation	Financial corporation
Sunniness	# of regressions during weeks 1-53	403	403	403
	% of positive coefficients	49.1%	49.1%	52.4%
	z-test	*-0.35*	*-0.35*	*0.95*
	total # of municipality/week observations	134,502	52,333	9,748
Length of day	# of regressions during weeks 1-53 ex 12-14 and 38-40	356	356	356
	% of positive coefficients	50.8%	56.2%	55.3%
	z-test	*0.32*	*2.33***	*2.01***
	total # of municipality/week observations	130,720	52,255	9,673

Panel B: Daily regressions with excess *ln* (number of trades) as dependent variable				
		Individual	Nonfinancial corporation	Financial corporation
Sunniness	# of regressions during weeks 1-53	1918	1918	1915
	% of positive coefficients	48.6%	49.0%	45.8%
	z-test	*-1.19*	*-0.91*	*-3.68****
	total # of municipality/week observations	444,704	128,718	20,612
Length of day	# of regressions during weeks 1-53 ex 12-14 and 38-40	1694	1694	1693
	% of positive coefficients	55.3%	58.9%	57.4%
	z-test	*4.32****	*7.34****	*6.05****
	total # of municipality/week observations	444,615	133,611	20,112

Table 6

Excess volume: Cross-sectional regressions with top-quintile Sunniness variation

Results for the binomial *z*-test for the impact of amount of *Sunniness* (from 1 to 10) on trading volume for top quintile of observation days with most cross-sectional variation in the actual amount of sunlight. The unit of observation is municipality and day. The specification is identical to Table 5. The sample period runs from January 1, 1995 through November 28, 2002. *, **, and *** denote significance (2-tailed) at 10%, 5%, and 1% levels, respectively.

Daily regressions with excess *ln* (number of trades) as dependent variable				
		Individual	Nonfinancial corporation	Financial corporation
Sunniness	# of regressions during weeks 1-53	361	361	315
	% of positive coefficients	46.8%	46.5%	53.9%
	z-test	*-1.21*	*-1.32*	*1.48*
	total # of municipality/week observations	86,236	25,535	4,157

Table 7

Excess volume: Cross-sectional regressions for SAD by gender

Results for the binomial *z*-test for the impact of the length of day on trading volume by individual investors by gender. The unit of observation is municipality and day/week. The specification is identical to Table 5. The sample period runs from January 1, 1995 through November 28, 2002. *, ** and *** denote significance (2-tailed) at 10%, 5% and 1% levels.

Panel A: Weekly regressions with excess *ln* (number of trades) as dependent variable

		Males	Females
Length of day	# of regressions during weeks 1-53 ex 12-14 and 38-40	356	356
	% of positive coefficients	44.4%	48.6%
	z-test	*-2.12***	*-0.53*
	total # of municipality/week observations	106,015	50,645

Panel B: Daily regressions with excess *ln* (number of trades) as dependent variable

		Males	Females
Length of day	# of regressions during weeks 1-53 ex 12-14 and 38-40	1694	1694
	% of positive coefficients	55.3%	55.3%
	z-test	*4.37****	*4.37****
	total # of municipality/week observations	414,317	216,226

Appendix 4

Including lagged dependent variable

Table 3

Buy ratio: Panel regressions for weather-related mood variables and calendar effects

The depended variable is buy ratio based on trade count and the model also includes lagged buy ratio. The base sample includes all trades by domestic investors in all Finnish stocks during the sample period of 1995-2002. There is one observation for each municipality/day combination and the sample is divided into domestic individuals, nonfinancial corporations and financial corporations. To enter the sample, the municipality must have at least 5 trades by the investor group on the given day and be in the sample of 444 municipalities (10 municipalities are excluded due to merger, other missing municipalities are due to having fewer than 5 trades). *Sunniness* takes the value of 1 for days when sky cannot be observed and 10 for clear sky. *Last 5 trading days of the year, First 5 five trading days of the year, Monday or after holiday*, *Friday or before holiday*, and *Last 3 and 1st trading of* month are self-explanatory calendar dummy variables. *Temperature* (Celsius) and *Precipitation* (millimeters) are demeaned by subtracting the municipality's average for that week of the year. *Vacation* is a dummy indicating if 1st to 9th grade primary schools were closed in the municipality on the trading day. All specifications include municipality and each month fixed effects as well as a constant term, and they are estimated with OLS. Absolute values of standard errors clustered at the daily level are reported below coefficients. Adjusted R-squared figures are reported for the full model. Asterisks mark statistical significance: *** for 1%, ** for 5%, and * for 10%.

Panel A: Individuals				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0003	0.0003	0.0002	-0.0003
	0.001	0.001	0.001	0.001
Last 5 days of year	-0.0003	0.0003	0.0038	-0.0107
	0.013	0.013	0.014	0.015
First 5 days of year	0.0371**	0.0366**	0.0375**	0.0271
	0.015	0.015	0.016	0.019
Monday or after holiday	-0.0049	-0.0049	-0.0042	-0.0029
	0.005	0.004	0.005	0.006
Friday or before holiday	-0.0179***	-0.0179***	-0.0149***	-0.0141**
	0.005	0.005	0.005	0.007
Last 3 and 1st day of m.	-0.004	-0.0039	-0.0047	-0.006
	0.005	0.005	0.005	0.006
Temperature (demeaned)		0.0003	0.0004	0.0009
		0.000	0.000	0.001
Vacation			-0.0042	
			0.006	
Precipitation (demeaned)				-0.0020***
				0.001
Lagged buy ratio	0.0983***	0.0984***	0.0953***	0.1140***
	0.004	0.004	0.004	0.006
Adj. R-squared	0.105	0.105	0.108	0.115
Number of observations	188,928	188,928	101,015	37,630
Number of municipalities	438	438	236	142

Panel B: Nonfinancial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.001	0.0009	0.001	-0.0014
	0.001	0.001	0.001	0.001
Last 5 days of year	0.0071	0.009	0.0115	0.0136
	0.014	0.014	0.016	0.021
First 5 days of year	0.0012	-0.0003	0.0002	0.000
	0.016	0.016	0.017	0.020
Monday or after holiday	-0.0052	-0.0051	-0.0031	-0.0095
	0.004	0.004	0.005	0.006
Friday or before holiday	-0.0171***	-0.0170***	-0.0161***	-0.0163**
	0.004	0.004	0.005	0.007
Last 3 and 1st day of m.	-0.0083*	-0.0082*	-0.0149***	-0.0082
	0.005	0.005	0.005	0.006
Temperature (demeaned)		0.0007*	0.0009*	0.0013*
		0.000	0.000	0.001
Vacation			0.003	
			0.007	
Precipitation (demeaned)				-0.0011
				0.001
Lagged buy ratio	0.0857***	0.0858***	0.0758***	0.0757***
	0.006	0.006	0.007	0.011
Adj. R-squared	0.026	0.027	0.028	0.03
Number of observations	38,809	38,809	22,188	10,194
Number of municipalities	262	262	150	87

Panel C: Financial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0015	0.0014	0.0013	-0.0025
	0.001	0.001	0.002	0.004
Last 5 days of year	-0.0449*	-0.0440*	-0.0006	-0.0283
	0.026	0.026	0.031	0.042
First 5 days of year	-0.0453*	-0.0460**	-0.0162	-0.0193
	0.023	0.023	0.035	0.036
Monday or after holiday	-0.0204**	-0.0203**	-0.0109	-0.0197
	0.008	0.008	0.010	0.014
Friday or before holiday	0.0071	0.0073	-0.0056	-0.0171
	0.008	0.008	0.009	0.014
Last 3 and 1st day of m.	-0.0088	-0.0087	-0.0230**	0.0022
	0.009	0.009	0.011	0.016
Temperature (demeaned)		0.0005	0.0009	-0.0014
		0.001	0.001	0.002
Vacation			0.0089	
			0.016	
Precipitation (demeaned)				-0.0048***
				0.002
Lagged buy ratio	0.1718***	0.1718***	0.1840***	0.1276***
	0.017	0.017	0.028	0.032
Adj. R-squared	0.047	0.046	0.064	0.048
Number of observations	5,507	5,507	2,832	1,710
Number of municipalities	98	98	52	26

Appendix 5

Including leading independent variable

Table 3

Buy ratio: Panel regressions for weather-related mood variables and calendar effects

The depended variable is buy ratio based on trade count. The base sample includes all trades by domestic investors in all Finnish stocks during the sample period of 1995-2002. There is one observation for each municipality/day combination and the sample is divided into domestic individuals, nonfinancial corporations and financial corporations. To enter the sample, the municipality must have at least 5 trades by the investor group on the given day and be in the sample of 444 municipalities (10 municipalities are excluded due to merger, other missing municipalities are due to having fewer than 5 trades). *Sunniness* takes the value of 1 for days when sky cannot be observed and 10 for clear sky. *Last 5 trading days of the year, First 5 five trading days of the year, Monday or after holiday, Friday or before holiday*, and *Last 3 and 1st trading of* month are self-explanatory calendar dummy variables. *Temperature* (Celsius) and *Precipitation* (millimeters) are demeaned by subtracting the municipality's average for that week of the year. *Vacation* is a dummy indicating if 1st to 9th grade primary schools were closed in the municipality on the trading day. Leading independent variables are specified as contemporaneous variables for following trading day of the observation. All specifications include municipality and each month fixed effects as well as a constant term, and they are estimated with OLS. Absolute values of standard errors clustered at the daily level are reported below coefficients. Adjusted R-squared figures are reported for the full model. Asterisks mark statistical significance: *** for 1%, ** for 5%, and * for 10%.

Panel A: Individuals				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0002	0.0002	0.0002	0.0012
	0.001	0.001	0.001	0.001
Last 5 days of year	-0.0001	-0.0004	0.0036	-0.0127
	0.014	0.014	0.015	0.015
First 5 days of year	0.0373**	0.0374**	0.0379**	0.0181
	0.015	0.015	0.016	0.022
Monday or after holiday	-0.0064	-0.0063	-0.0062	0.0086
	0.005	0.005	0.005	0.007
Friday or before holiday	-0.0179***	-0.0179***	-0.0156***	-0.0104
	0.005	0.005	0.006	0.008
Last 3 and 1st day of m.	-0.0044	-0.0044	-0.0053	-0.0089
	0.005	0.005	0.005	0.008
Temperature (demeaned)			0.0006	0.0015**
			0.000	0.001
Vacation			-0.0049	
			0.006	
Precipitation (demeaned)				-0.0013*
				0.001
Leading sunniness	0.0001	0.0001	0.0007	0.002
	0.001	0.001	0.001	0.001
Leading temperature (demeaned)		-0.0005	-0.0004	-0.0006
		0.000	0.000	0.001
Leading precipitation				0.000
				0.001
Adj. R-squared	0.095	0.095	0.100	0.096
Number of observations	188,507	188,507	100,775	23,948
Number of municipalities	440	440	236	138

Panel B: Nonfinancial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0005	0.0004	0.0004	-0.0008
	0.001	0.001	0.001	0.002
Last 5 days of year	0.015	0.0163	0.0129	0.0101
	0.014	0.014	0.017	0.026
First 5 days of year	0.0032	0.0021	0.0031	-0.0112
	0.015	0.015	0.018	0.025
Monday or after holiday	-0.0080*	-0.0077*	-0.0059	-0.0051
	0.004	0.004	0.005	0.008
Friday or before holiday	-0.0173***	-0.0171***	-0.0182***	-0.0167**
	0.004	0.004	0.005	0.008
Last 3 and 1st day of m.	-0.0122***	-0.0121***	-0.0157***	-0.0188**
	0.005	0.005	0.005	0.009
Temperature (demeaned)			0.0008	0.0015
			0.001	0.001
Vacation			0.0054	
			0.007	
Precipitation (demeaned)				-0.0006
				0.001
Leading sunniness	0.0009	0.001	0.0002	0.0018
	0.001	0.001	0.001	0.002
Leading temperature (demeaned)		-0.0006	0.0004	-0.0005
		0.000	0.001	0.001
Leading precipitation				-0.0011
				0.001
Adj. R-squared	0.019	0.019	0.022	0.022
Number of observations	38,577	38,577	22,109	6,129
Number of municipalities	281	281	160	89

Panel C: Financial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0019	0.0019	0.0023	-0.0005
	0.001	0.001	0.002	0.006
Last 5 days of year	-0.0831***	-0.0813***	-0.0570*	-0.1509**
	0.026	0.026	0.032	0.061
First 5 days of year	-0.0009	-0.0029	0.0854**	0.0067
	0.028	0.028	0.04	0.041
Monday or after holiday	-0.0221***	-0.0226***	-0.0125	-0.0008
	0.008	0.008	0.01	0.021
Friday or before holiday	0.0097	0.0094	-0.0014	0.0153
	0.008	0.008	0.01	0.02
Last 3 and 1st day of m.	-0.0119	-0.0118	-0.0223**	-0.0161
	0.009	0.009	0.011	0.024
Temperature (demeaned)			0.0001	-0.0014
			0.002	0.003
Vacation			0.0121	
			0.016	
Precipitation (demeaned)				-0.0044**
				0.002
Leading sunniness	0.0013	0.0011	-0.0003	0.0203***
	0.001	0.001	0.002	0.006
Leading temperature (demeaned)		0.0020*	0.0002	0.0005
		0.001	0.001	0.003
Leading precipitation				0.0022
				0.003
Adj. R-squared	0.014	0.014	0.019	0.037
Number of observations	5,658	5,658	2,926	1,011
Number of municipalities	122	122	60	25

Appendix 6

Including lagged independent variable

Table 3A

Buy ratio with lagged independent variable: Panel regressions for weather-related mood variables and calendar effects

The depended variable is buy ratio based on trade count. The base sample includes all trades by domestic investors in all Finnish stocks during the sample period of 1995-2002. There is one observation for each municipality/day combination and the sample is divided into domestic individuals, nonfinancial corporations and financial corporations. To enter the sample, the municipality must have at least 5 trades by the investor group on the given day and be in the sample of 444 municipalities (10 municipalities are excluded due to merger, other missing municipalities are due to having fewer than 5 trades). *Sunniness* takes the value of 1 for days when sky cannot be observed and 10 for clear sky. *Last 5 trading days of the year, First 5 five trading days of the year, Monday or after holiday, Friday or before holiday,* and *Last 3 and 1st trading of* month are self-explanatory calendar dummy variables. *Temperature* (Celsius) and *Precipitation* (millimeters) are demeaned by subtracting the municipality's average for that week of the year. *Vacation* is a dummy indicating if 1st to 9th grade primary schools were closed in the municipality on the trading day. Lagged independent variables are specified as contemporaneous variables but with a lag of one trading day. All specification include municipality and each month fixed effects as well as a constant term, and they are estimated with OLS. Absolute values of standard errors clustered at the daily level are reported below coefficients. Adjusted R-squared figures are reported for the full model. Asterisks mark statistical significance: *** for 1%, ** for 5%, and * for 10%.

Panel A: Individuals				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0002	0.0002	0.0001	-0.0004
	0.001	0.001	0.001	0.001
Last 5 days of year	0.0007	0.0016	0.0044	-0.0109
	0.014	0.014	0.015	0.018
First 5 days of year	0.0389**	0.0383**	0.0392**	0.0236
	0.015	0.015	0.016	0.02
Monday or after holiday	-0.007	-0.0069	-0.0061	-0.0114
	0.005	0.005	0.005	0.007
Friday or before holiday	-0.0188***	-0.0186***	-0.0155***	-0.0183**
	0.005	0.005	0.006	0.008
Last 3 and 1st day of m.	-0.0043	0.000	-0.0051	-0.0052
	0.005	0.005	0.005	0.008
Temperature (demeaned)		-0.0001	0.0002	0.0005
		0.000	0.000	0.001
Vacation			-0.0047	
			0.006	
Precipitation (demeaned)				-0.0017**
				0.001
Lagged sunniness	0.0010*	0.0010*	0.0011*	0.0005
	0.001	0.001	0.001	0.001
Lagged temperature (demeaned)		0.0006	0.0004	0.0017**
		0.000	0.000	0.001
Lagged precipitation				-0.0004
				0.001
Adj. R-squared	0.094	0.094	0.098	0.091
Number of observations	187,649	187,649	100,450	23,973
Number of municipalities	438	438	236	141

Panel B: Nonfinancial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0011*	0.0010*	0.0011	0.0009
	0.0010	0.0010	0.0010	0.0020
Last 5 days of year	0.0068	0.0092	0.0103	-0.0083
	0.0140	0.0140	0.0160	0.0240
First 5 days of year	0.0021	0.0005	0.0021	-0.0114
	0.0160	0.0160	0.0170	0.0240
Monday or after holiday	-0.0070	-0.0069	-0.0055	-0.0137
	0.0040	0.0040	0.0050	0.0090
Friday or before holiday	-0.0178***	-0.0176***	-0.0172***	-0.0169**
	0.0040	0.0040	0.0050	0.0090
Last 3 and 1st day of m.	-0.0089*	-0.0088*	-0.0153***	-0.0064
	0.0050	0.0050	0.0050	0.0080
Temperature (demeaned)		0.0003	0.0007	0.0017
		0.0000	0.0010	0.0010
Vacation			0.0029	
			0.0070	
Precipitation (demeaned)				-0.0012
				0.0010
Lagged sunniness	-0.0001	-0.0002	0.0001	-0.0001
	0.0010	0.0010	0.0010	0.0020
Lagged temperature (demeaned)		0.0006	0.0004	0.0008
		0.0000	0.0010	0.0010
Lagged precipitation				-0.0012
				0.0010
Adj. R-squared	0.017	0.017	0.020	0.021
Number of observations	38,299	38,299	21,974	6,174
Number of municipalities	261	261	150	84

Panel C: Financial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0018	0.0018	0.0018	0.0046
	0.001	0.001	0.002	0.005
Last 5 days of year	-0.0558**	-0.0550**	-0.0043	-0.0278
	0.027	0.027	0.034	0.059
First 5 days of year	-0.0485**	-0.0490**	0.0039	0.0337
	0.024	0.024	0.035	0.046
Monday or after holiday	-0.0192**	-0.0191**	-0.0123	-0.0178
	0.008	0.008	0.010	0.021
Friday or before holiday	0.0095	0.0096	-0.0047	0.0056
	0.008	0.008	0.009	0.019
Last 3 and 1st day of m.	-0.0104	-0.0103	-0.0249**	0.0218
	0.009	0.009	0.011	0.022
Temperature (demeaned)		0.0004	-0.0009	0.0009
		0.001	0.002	0.003
Vacation			0.0078	
			0.016	
Precipitation (demeaned)				-0.0071***
				0.002
Lagged sunniness	0.0004	0.0004	0.0002	-0.0004
	0.001	0.001	0.002	0.006
Lagged temperature (demeaned)		0.0001	0.0027*	-0.0033
		0.001	0.002	0.003
Lagged precipitation				0.0009
				0.002
Adj. R-squared	0.011	0.011	0.023	0.033
Number of observations	5,497	5,497	2,826	1,014
Number of municipalities	98	98	52	21

Table 3B

Buy ratio: PCSE panel regressions for weather-related mood variables and calendar effects

The depended variable is buy ratio based on trade count. The base sample includes all trades by domestic investors in all Finnish stocks during the sample period of 1995-2002. There is one observation for each municipality/day combination and the sample is divided into domestic individuals, nonfinancial corporations and financial corporations. To enter the sample, the municipality must have at least 5 trades by the investor group on the given day and be in the sample of 444 municipalities (10 municipalities are excluded due to merger, other missing municipalities are due to having fewer than 5 trades). *Sunniness* takes the value of 1 for days when sky cannot be observed and 10 for clear sky. *Last 5 trading days of the year, First 5 five trading days of the year, Monday or after holiday, Friday or before holiday,* and *Last 3 and 1st trading of* month are self-explanatory calendar dummy variables. *Temperature* (Celsius) and *Precipitation* (millimeters) are demeaned by subtracting the municipality's average for that week of the year. *Vacation* is a dummy indicating if 1st to 9th grade primary schools were closed in the municipality on the trading day. All specification include municipality and calendar month fixed effects as well as a constant term, and they are estimated with Prais-Winsten regression with correlated panels corrected standard errors (PCSE). Absolute values of standard errors clustered at the daily level are reported below coefficients. Adjusted R-squared figures are reported for the full model. Asterisks mark statistical significance: *** for 1%, ** for 5%, and * for 10%.

Panel A: Individuals				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	-0.0006	-0.0006	-0.0006	-0.0002
	0.001	0.001	0.001	0.001
Last 5 days of year	0.0009	0.0008	0.0029	-0.0077
	0.020	0.020	0.020	0.022
First 5 days of year	0.0350*	0.0350*	0.0361*	0.0350*
	0.019	0.019	0.019	0.020
Monday or after holiday	-0.0066	-0.0066	-0.0061	-0.0069
	0.005	0.005	0.005	0.006
Friday or before holiday	-0.0166***	-0.0166***	-0.0144***	-0.0136**
	0.005	0.005	0.005	0.006
Last 3 and 1st day of m.	-0.0033	-0.0033	-0.0045	-0.0038
	0.006	0.006	0.006	0.007
Temperature (demeaned)		0.0000	0.0002	0.0008
		0.0000	0.0000	0.001
Vacation			-0.0033	
			0.006	
Precipitation (demeaned)				-0.0020***
				0.001
Adj. R-squared	0.081	0.081	0.086	0.105
Number of observations	200,597	200,597	105,925	39,386
Number of municipalities	444	444	236	144

Panel B: Nonfinancial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0005	0.0004	0.0006	0.0003
	0.001	0.001	0.001	0.002
Last 5 days of year	0.0111	0.0129	0.0192	0.0077
	0.016	0.016	0.019	0.022
First 5 days of year	0.0053	0.004	-0.0006	0.0114
	0.016	0.016	0.018	0.021
Monday or after holiday	-0.0064	-0.0063	-0.0021	-0.0131**
	0.004	0.004	0.005	0.007
Friday or before holiday	-0.0138***	-0.0137***	-0.0145***	-0.0137**
	0.004	0.004	0.005	0.007
Last 3 and 1st day of m.	-0.0115**	-0.0114**	-0.0154***	-0.0046
	0.005	0.005	0.006	0.008
Temperature (demeaned)		0.0007*	0.0010**	0.0020***
		0.000	0.000	0.001
Vacation			-0.002	
			0.008	
Precipitation (demeaned)				-0.0004
				0.001
Adj. R-squared	0.03	0.03	0.032	0.043
Number of observations	44,488	44,488	25,259	11,173
Number of municipalities	354	354	191	107

Panel C: Financial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0012	0.0012	0.002	-0.005
	0.001	0.001	0.002	0.004
Last 5 days of year	-0.0930***	-0.0930***	-0.0669	-0.1007**
	0.036	0.036	0.051	0.050
First 5 days of year	0.0115	0.0116	0.0501	0.0115
	0.037	0.037	0.052	0.049
Monday or after holiday	-0.0196**	-0.0196**	-0.0147	-0.0275*
	0.008	0.008	0.010	0.014
Friday or before holiday	-0.0026	-0.0026	-0.0169*	-0.0229
	0.008	0.008	0.01	0.014
Last 3 and 1st day of m.	-0.0056	-0.0056	-0.0217	-0.0028
	0.011	0.011	0.014	0.019
Temperature (demeaned)		0.000	-0.0009	0.0005
		0.001	0.001	0.002
Vacation			-0.0124	
			0.022	
Precipitation (demeaned)				-0.0038**
				0.002
Adj. R-squared	0.061	0.061	0.106	0.115
Number of observations	6,866	6,866	3,544	2,008
Number of municipalities	174	174	87	52

Appendix 7

Leaving out calendar controls

Table 3

Buy ratio: Panel regressions for weather-related mood variables

The depended variable is buy ratio based on trade count. The base sample includes all trades by domestic investors in all Finnish stocks during the sample period of 1995-2002. There is one observation for each municipality/day combination and the sample is divided into domestic individuals, nonfinancial corporations and financial corporations. To enter the sample, the municipality must have at least 5 trades by the investor group on the given day and be in the sample of 444 municipalities (10 municipalities are excluded due to merger, other missing municipalities are due to having fewer than 5 trades). *Sunniness* takes the value of 1 for days when sky cannot be observed and 10 for clear sky. *Temperature* (Celsius) and *Precipitation* (millimeters) are demeaned by subtracting the municipality's average for that week of the year. *Vacation* is a dummy indicating if 1st to 9th grade primary schools were closed in the municipality on the trading day. All specification include municipality and each month fixed effects as well as a constant term, and they are estimated with OLS. Absolute values of standard errors clustered at the daily level are reported below coefficients. Adjusted R-squared figures are reported for the full model. Asterisks mark statistical significance: *** for 1%, ** for 5%, and * for 10%.

Panel A: Individuals				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0002	0.0002	0.0002	-0.0002
	0.001	0.001	0.001	0.001
Temperature (demeaned)		0.0003	0.0005	0.0011*
		0.000	0.000	0.001
Vacation			-0.0025	
			0.006	
Precipitation (demeaned)				-0.0019***
				0.001
Adj. R-squared	200,597	200,597	105,925	39,386
Number of observations	444	444	236	144
Number of municipalities	0.089	0.089	0.095	0.098

Panel B: Nonfinancial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0009	0.0009	0.0008	-0.0002
	0.001	0.001	0.001	0.001
Temperature (demeaned)		0.0009**	0.0010**	0.0020***
		0.000	0.000	0.001
Vacation			0.0028	
			0.007	
Precipitation (demeaned)				-0.0005
				0.001
Adj. R-squared	44,488	44,488	25,259	11,173
Number of observations	354	354	191	107
Number of municipalities	0.014	0.014	0.016	0.018

Panel C: Financial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0015	0.0014	0.0021	-0.0027
	0.001	0.001	0.002	0.004
Temperature (demeaned)		0.0009	0.0005	0.0004
		0.001	0.001	0.002
Vacation			-0.0129	
			0.015	
Precipitation (demeaned)				-0.0037**
				0.002
Adj. R-squared	6,866	6,866	3,544	2,008
Number of observations	174	174	87	52
Number of municipalities	0.012	0.011	0.019	0.016

Appendix 8

Cross-sectional clustering of standard errors

Table 3

Buy ratio: Panel regressions for weather-related mood variables and calendar effects

The depended variable is buy ratio based on trade count. The base sample includes all trades by domestic investors in all Finnish stocks during the sample period of 1995-2002. There is one observation for each municipality/day combination and the sample is divided into domestic individuals, nonfinancial corporations and financial corporations. To enter the sample, the municipality must have at least 5 trades by the investor group on the given day and be in the sample of 444 municipalities (10 municipalities are excluded due to merger, other missing municipalities are due to having fewer than 5 trades). *Sunniness* takes the value of 1 for days when sky cannot be observed and 10 for clear sky. *Last 5 trading days of the year, First 5 five trading days of the year, Monday or after holiday, Friday or before holiday,* and *Last 3 and 1st trading of* month are self-explanatory calendar dummy variables. *Temperature* (Celsius) and *Precipitation* (millimeters) are demeaned by subtracting the municipality's average for that week of the year. *Vacation* is a dummy indicating if 1st to 9th grade primary schools were closed in the municipality on the trading day. All specifications include municipality and each month fixed effects as well as a constant term, and they are estimated with OLS. Absolute values of standard errors clustered at the municipality level are reported below coefficients. Adjusted R-squared figures are reported for the full model. Asterisks mark statistical significance: *** for 1%, ** for 5%, and * for 10%.

Panel A: Individuals				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0002	0.0002	0.0002	-0.0001
	0.000	0.000	0.000	0.001
Last 5 days of year	0.0022	0.0027	0.0052	-0.0076
	0.005	0.005	0.006	0.009
First 5 days of year	0.0378***	0.0374***	0.0382***	0.0311***
	0.004	0.004	0.005	0.007
Monday or after holiday	-0.0064***	-0.0064***	-0.0066***	-0.0041
	0.001	0.001	0.002	0.003
Friday or before holiday	-0.0177***	-0.0177***	-0.0151***	-0.0144***
	0.001	0.001	0.002	0.003
Last 3 and 1st day of m.	-0.0039**	-0.0038**	-0.0050**	-0.0057*
	0.002	0.002	0.002	0.003
Temperature (demeaned)		0.0002	0.0004**	0.0009***
		0.000	0.000	0.000
Vacation			-0.0046	
			0.003	
Precipitation (demeaned)				-0.0019***
				0.000
Adj. R-squared	0.091	0.091	0.096	0.099
Number of observations	200,597	200,597	105,925	39,386
Number of municipalities	444	444	236	144

Panel B: Nonfinancial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0009*	0.0008	0.0007	-0.0003
	0.001	0.001	0.001	0.001
Last 5 days of year	0.0073	0.0095	0.0108	0.0115
	0.012	0.013	0.018	0.017
First 5 days of year	0.0053	0.0035	0.0017	0.0051
	0.009	0.009	0.012	0.013
Monday or after holiday	-0.0067*	-0.0066*	-0.0026	-0.0112**
	0.004	0.004	0.005	0.006
Friday or before holiday	-0.0158***	-0.0156***	-0.0168***	-0.0142***
	0.003	0.003	0.005	0.004
Last 3 and 1st day of m.	-0.0109***	-0.0108***	-0.0153***	-0.0096
	0.004	0.004	0.005	0.006
Temperature (demeaned)		0.0009**	0.0010**	0.0020***
		0.000	0.000	0.001
Vacation			0.0019	
			0.007	
Precipitation (demeaned)				-0.0006
				0.001
Adj. R-squared	0.014	0.015	0.017	0.018
Number of observations	44,488	44,488	25,259	11,173
Number of municipalities	354	354	191	107

Panel C: Financial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0017	0.0016	0.0023	-0.0023
	0.001	0.001	0.002	0.003
Last 5 days of year	-0.1028**	-0.1018**	-0.0547	-0.1093
	0.042	0.042	0.046	0.065
First 5 days of year	-0.0047	-0.0057	0.0565	0.006
	0.031	0.031	0.047	0.043
Monday or after holiday	-0.0252*	-0.0251*	-0.0204	-0.0272
	0.013	0.013	0.02	0.027
Friday or before holiday	0.0004	0.0006	-0.0108	-0.0182
	0.011	0.011	0.016	0.020
Last 3 and 1st day of m.	-0.0035	-0.0035	-0.0215	-0.0024
	0.010	0.010	0.014	0.030
Temperature (demeaned)		0.0006	0.0003	0.0002
		0.001	0.001	0.001
Vacation			-0.0076	
			0.015	
Precipitation (demeaned)				-0.0038
				0.002
Adj. R-squared	0.014	0.014	0.021	0.019
Number of observations	6,866	6,866	3,544	2,008
Number of municipalities	174	174	87	52

Appendix 9

Including SAD measure in the panel regression

Table 3

Buy ratio: Panel regressions for weather-related mood variables and calendar effects

The depended variable is buy ratio based on trade count. The base sample includes all trades by domestic investors in all Finnish stocks during the sample period of 1995-2002. There is one observation for each municipality/day combination and the sample is divided into domestic individuals, nonfinancial corporations and financial corporations. To enter the sample, the municipality must have at least 5 trades by the investor group on the given day and be in the sample of 444 municipalities (10 municipalities are excluded due to merger, other missing municipalities are due to having fewer than 5 trades). *Sunniness* takes the value of 1 for days when sky cannot be observed and 10 for clear sky. *Last 5 trading days of the year, First 5 five trading days of the year, Monday or after holiday, Friday or before holiday*, and *Last 3 and 1st trading of* month are self-explanatory calendar dummy variables. *Temperature* (Celsius) and *Precipitation* (millimeters) are demeaned by subtracting the municipality's average for that week of the year. *Vacation* is a dummy indicating if 1st to 9th grade primary schools were closed in the municipality on the trading day. *Length of day* is in hours. All specifications include municipality and each month fixed effects as well as a constant term, and they are estimated with OLS. Absolute values of standard errors clustered at the daily level are reported below coefficients. Adjusted R-squared figures are reported for the full model. Asterisks mark statistical significance: *** for 1%, ** for 5%, and * for 10%.

Panel A: Individuals				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0002	0.0002	0.0002	-0.0001
	-0.001	-0.001	-0.001	-0.001
Last 5 days of year	0.0014	0.0019	0.0046	-0.008
	-0.014	-0.014	-0.015	-0.015
First 5 days of year	0.0355**	0.0351**	0.0363**	0.0292
	-0.015	-0.015	-0.016	-0.019
Monday or after holiday	-0.0061	-0.0061	-0.0066	-0.0041
	-0.005	-0.005	-0.005	-0.006
Friday or before holiday	-0.0177***	-0.0177***	-0.0151***	-0.0143**
	-0.006	-0.006	-0.006	-0.007
Last 3 and 1st day of m.	-0.0042	-0.0042	-0.0049	-0.0058
	-0.005	-0.005	-0.005	-0.007
Temperature (demeaned)		0.0002	0.0005	0.0009
		0.0000	0.0000	-0.001
Vacation			-0.0041	
			-0.006	
Precipitation (demeaned)				-0.0019***
				-0.001
Length of day (hours)	-0.002	-0.002	-0.0015	-0.0019
	-0.002	-0.002	-0.002	-0.003
Adj. R-squared	0.090	0.090	0.096	0.099
Number of observations	196,597	196,597	105,925	39,386
Number of municipalities	441	441	236	144

Panel B: Nonfinancial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.001	0.0009	0.0007	-0.0002
	0.001	0.001	0.001	0.001
Last 5 days of year	0.0067	0.009	0.0101	0.0107
	0.013	0.013	0.017	0.022
First 5 days of year	0.0028	0.0009	-0.0004	0.0006
	0.016	0.016	0.018	0.019
Monday or after holiday	-0.0071	-0.007	-0.0026	-0.0112*
	0.004	0.004	0.005	0.006
Friday or before holiday	-0.0156***	-0.0155***	-0.0167***	-0.0140**
	0.004	0.004	0.005	0.007
Last 3 and 1st day of m.	-0.0105**	-0.0104**	-0.0152***	-0.0099
	0.005	0.005	0.005	0.007
Temperature (demeaned)		0.0009**	0.0010**	0.0020***
		0.0000	0.0000	0.001
Vacation			0.0025	
			0.007	
Precipitation (demeaned)				-0.0006
				0.001
Length of day (hours)	-0.0011	-0.0011	-0.0017	-0.0048
	0.002	0.002	0.002	0.003
Adj. R-squared	0.015	0.015	0.017	0.018
Number of observations	43,142	43,142	25,259	11,173
Number of municipalities	351	351	191	107

Panel C: Financial corporations				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0017	0.0016	0.0023	-0.0023
	0.001	0.001	0.002	0.004
Last 5 days of year	-0.1024***	-0.1014***	-0.0539	-0.1100**
	0.028	0.028	0.034	0.043
First 5 days of year	-0.0019	-0.0029	0.0586	0.0026
	0.029	0.029	0.043	0.040
Monday or after holiday	-0.0251***	-0.0250***	-0.0204*	-0.0273*
	0.009	0.009	0.011	0.015
Friday or before holiday	0.0003	0.0005	-0.0109	-0.018
	0.008	0.008	0.011	0.015
Last 3 and 1st day of m.	-0.0035	-0.0035	-0.0215*	-0.0027
	0.009	0.009	0.012	0.016
Temperature (demeaned)		0.0006	0.0003	0.0002
		0.001	0.001	0.002
Vacation			-0.0085	
			0.018	
Precipitation (demeaned)				-0.0038**
				0.002
Length of day (hours)	0.0028	0.0027	0.0017	-0.0037
	0.005	0.005	0.006	0.009
Adj. R-squared	0.014	0.014	0.020	0.018
Number of observations	6,859	6,859	3,544	2,008
Number of municipalities	172	172	87	52

Appendix 10

Individual sample splits in the panel regression

Table 3

Buy ratio: Panel regressions for weather-related mood variables and calendar effects

The depended variable is buy ratio based on trade count. The base sample includes all trades by domestic individual investors in all Finnish stocks during the sample period of 1995-2002. There is one observation for each municipality/day combination. Panels A and B report results by gender, Panels C and D by age groups, Panels E and F by volatility of stock traded (below or above mean volatility), and Panels G and H by trading activity (frequent traders trade on $\geq$20 weeks during fiscal year). To enter the sample, the municipality must have at least 5 trades by the investor group on the given day and be in the sample of 444 municipalities (10 municipalities are excluded due to merger, other missing municipalities are due to having fewer than 5 trades). *Sunniness* takes the value of 1 for days when sky cannot be observed and 10 for clear sky. *Last 5 trading days of the year, First 5 five trading days of the year, Monday or after holiday, Friday or before holiday,* and *Last 3 and 1st trading of* month are self-explanatory calendar dummy variables. *Temperature* (Celsius) and *Precipitation* (millimeters) are demeaned by subtracting the municipality's average for that week of the year. *Vacation* is a dummy indicating if 1st to 9th grade primary schools were closed in the municipality on the trading day. All specifications include municipality and each month fixed effects as well as a constant term, and they are estimated with OLS. Absolute values of standard errors clustered at the daily level are reported below coefficients. Adjusted R-squared figures are reported for the full model. Asterisks mark statistical significance: *** for 1%, ** for 5%, and * for 10%.

Panel A: Males				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	-0.0001	-0.0001	-0.0002	0.000
	-0.137	-0.117	-0.257	-0.031
Last 5 days of year	0.0331*	0.0331*	0.0294	0.0189
	1.653	1.655	1.508	0.948
First 5 days of year	-0.0312**	-0.0311**	-0.0324**	-0.0410**
	-2.034	-2.028	-2.035	-2.577
Monday or after holiday	0.0023	0.0023	0.0013	-0.0002
	0.345	0.346	0.188	-0.035
Friday or before holiday	0.0135*	0.0135*	0.0122*	0.0039
	1.793	1.794	1.659	0.541
Last 3 and 1st day of m.	0.003	0.0031	0.0044	-0.0024
	0.396	0.399	0.578	-0.325
Temperature (demeaned)		0.0031***	0.0019**	0.0022
		3.873	1.993	1.136
Vacation			0.0051	
			0.723	
Precipitation (demeaned)				-0.0015*
				-1.798
Adj. R-squared	0.078	0.078	0.086	0.107
Number of observations	179,472	179,472	95,519	28,194
Number of municipalities	442	442	236	63

Panel B: Females				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0002	0.0003	-0.0005	-0.0004
	0.175	0.187	-0.319	-0.326
Last 5 days of year	0.0467	0.0469	0.0451	0.0418
	1.417	1.422	1.418	1.370
First 5 days of year	-0.0613***	-0.0612***	-0.0710***	-0.0741***
	-3.582	-3.571	-3.593	-3.694
Monday or after holiday	0.0005	0.0005	-0.0019	0.0072
	0.040	0.040	-0.164	0.752
Friday or before holiday	0.0076	0.0076	0.0045	0.0019
	0.669	0.670	0.399	0.195
Last 3 and 1st day of m.	0.0053	0.0053	0.0082	-0.0066
	0.415	0.413	0.647	-0.640
Temperature (demeaned)		0.0026*	0.0041**	-0.0038
		1.709	2.166	-1.088
Vacation			-0.0067	
			-0.614	
Precipitation (demeaned)	0.0002	0.0003	-0.0005	-0.0004
	0.175	0.187	-0.319	-0.326
Adj. R-squared	0.147	0.147	0.156	0.154
Number of observations	58,883	58,883	33,318	14,653
Number of municipalities	427	427	229	62

Panel C: Individuals born 1954 or after				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	-0.0004	-0.0003	-0.0009	-0.0001
	-0.367	-0.341	-0.898	-0.136
Last 5 days of year	0.0313	0.0314	0.0292	0.0142
	1.261	1.267	1.235	0.631
First 5 days of year	-0.0263*	-0.0261*	-0.0262*	-0.0289*
	-1.759	-1.748	-1.664	-1.730
Monday or after holiday	0.0046	0.0047	0.0038	0.0043
	0.580	0.584	0.467	0.597
Friday or before holiday	0.0177**	0.0177**	0.0151*	0.0107
	2.174	2.176	1.839	1.411
Last 3 and 1st day of m.	0.0074	0.0074	0.0092	0.0007
	0.884	0.886	1.092	0.088
Temperature (demeaned)		0.0047***	0.0037***	0.0037
		4.965	3.210	1.577
Vacation			-0.0014	
			-0.170	
Precipitation (demeaned)				-0.0006
				-0.580
Adj. R-squared	0.082	0.082	0.090	0.119
Number of observations	112,491	112,491	62,061	20,845
Number of municipalities	438	438	234	60

Panel D: Individuals born before year 1954				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0001	0.0001	0.0001	0.0006
	0.143	0.160	0.126	0.616
Last 5 days of year	0.0366*	0.0367*	0.0359	0.0307
	1.648	1.653	1.641	1.373
First 5 days of year	-0.0432**	-0.0430**	-0.0397**	-0.0588***
	-2.547	-2.536	-2.213	-3.566
Monday or after holiday	0.0003	0.0003	-0.0028	-0.0049
	0.037	0.037	-0.348	-0.645
Friday or before holiday	0.0088	0.0088	0.0082	-0.0045
	1.022	1.021	0.987	-0.549
Last 3 and 1st day of m.	0.0019	0.0019	0.0024	-0.0044
	0.207	0.208	0.274	-0.522
Temperature (demeaned)		0.0031***	0.0021*	-0.0020
		3.211	1.834	-0.888
Vacation			0.0044	
			0.568	
Precipitation (demeaned)				-0.0018*
				-1.786
Adj. R-squared	0.095	0.095	0.102	0.121
Number of observations	140,223	140,223	75,885	24,506
Number of municipalities	443	443	236	64

Panel E: Low volatility stocks				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0013	0.0013	0.0017**	0.0017
	1.582	1.598	2.017	1.640
Last 5 days of year	0.0301*	0.0303*	0.0379**	0.0048
	1.719	1.729	2.140	0.268
First 5 days of year	-0.0355***	-0.0354***	-0.0315**	-0.0514***
	-2.768	-2.755	-2.201	-3.311
Monday or after holiday	-0.0018	-0.0017	-0.006	-0.0035
	-0.228	-0.225	-0.782	-0.480
Friday or before holiday	-0.014	-0.0141	-0.0203**	-0.0143
	-1.317	-1.319	-2.082	-1.568
Last 3 and 1st day of m.	-0.0109	-0.0108	-0.0042	-0.0116
	-0.979	-0.974	-0.430	-1.282
Temperature (demeaned)		0.0030**	0.0036**	0.0071**
		2.384	2.191	2.345
Vacation			-0.0048	
			-0.727	
Precipitation (demeaned)				-0.0013
				-0.946
Adj. R-squared	0.106	0.106	0.108	0.135
Number of observations	84,096	84,096	46,588	19,331
Number of municipalities	438	438	232	64

Panel F: High volatility stocks				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	-0.0013	-0.0013	-0.0016	-0.0023**
	-1.281	-1.256	-1.550	-2.130
Last 5 days of year	0.0018	0.0019	-0.0033	0.0005
	0.082	0.083	-0.141	0.022
First 5 days of year	-0.0377*	-0.0376*	-0.0454**	-0.0291
	-1.82	-1.817	-2.145	-1.472
Monday or after holiday	-0.0003	-0.0003	0.0007	-0.003
	-0.038	-0.036	0.075	-0.388
Friday or before holiday	0.0240***	0.0240***	0.0226***	0.012
	2.860	2.860	2.655	1.578
Last 3 and 1st day of m.	0.0112	0.0112	0.010	0.0036
	1.294	1.297	1.116	0.478
Temperature (demeaned)		0.0036***	0.0031***	0.0024
		4.547	3.225	1.203
Vacation			0.0037	
			0.408	
Precipitation (demeaned)				-0.0009
				-1.503
Adj. R-squared	0.086	0.086	0.088	0.124
Number of observations	147,835	147,835	79,342	22,446
Number of municipalities	441	441	234	62

Panel G: Occasional traders				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	0.0002	0.0002	-0.0001	0.0003
	0.189	0.203	-0.136	0.259
Last 5 days of year	0.0244	0.0244	0.0238	0.0137
	1.089	1.090	1.080	0.630
First 5 days of year	-0.0553***	-0.0552***	-0.0587***	-0.0698***
	-3.293	-3.286	-3.288	-4.275
Monday or after holiday	0.0059	0.0059	0.004	0.0067
	0.737	0.739	0.491	0.879
Friday or before holiday	0.0047	0.0047	0.0014	-0.0021
	0.521	0.521	0.162	-0.255
Last 3 and 1st day of m.	0.0036	0.0036	0.007	-0.0017
	0.386	0.388	0.764	-0.197
Temperature (demeaned)		0.0029***	0.0020*	0.0000
		2.906	1.813	0.0000
Vacation			0.0012	
			0.154	
Precipitation (demeaned)				-0.0013
				-1.501
Adj. R-squared	0.146	0.146	0.157	0.174
Number of observations	159,355	159,355	85,674	27,730
Number of municipalities	444	444	236	64

Panel H: Frequent traders				
Buy ratio as dependent variable	(1)	(2)	(3)	(4)
Sunniness	-0.0007	-0.0007	-0.0002	-0.0012
	-1.165	-1.158	-0.317	-1.472
Last 5 days of year	0.0308*	0.0308*	0.0163	0.0212
	1.804	1.805	0.857	1.146
First 5 days of year	0.0044	0.0044	0.0003	0.0157
	0.272	0.272	0.019	0.805
Monday or after holiday	-0.0024	-0.0024	-0.0025	-0.006
	-0.471	-0.471	-0.441	-1.028
Friday or before holiday	0.0290***	0.0290***	0.0311***	0.0211***
	5.651	5.651	5.588	3.903
Last 3 and 1st day of m.	0.0044	0.0044	0.0007	-0.0028
	0.789	0.79	0.118	-0.494
Temperature (demeaned)		0.0008	0.0002	0.002
		0.978	0.169	0.886
Vacation			0.0051	
			0.768	
Precipitation (demeaned)				0.0011
				0.984
Adj. R-squared	0.020	0.020	0.020	0.022
Number of observations	89,168	89,168	49,511	15,778
Number of municipalities	389	389	209	40

Appendix 11

Including equinoxes and only fall and winter weeks for SAD

Table 5

Excess buy ratio: Cross-sectional regressions for SAD

Results for the binomial *z*-test for the impact of amount of *Length of day* (the number of hours between sunrise and sunset) on the investor group. The unit of observation is municipality and day/week. The dependent variable excess buy ratio (see Section 3 for exact variable descriptions) is regressed on *Length of day* and a constant. The *z*-test statistic is computed with the binomial test as (% of positive coefficients when regressing excess buy ratio on *Length of day* for each municipality –50%) / (0.5*0.5/Number of observations in the regression)$^{0.5}$. The sample period runs from January 1, 1995 through November 28, 2002. *, **, and *** denote significance (2-tailed) at 10%, 5%, and 1% levels, respectively.

Panel A: Weekly regressions with excess buy ratio as dependent variable

		Individual	Nonfinancial corporation	Financial corporation
Length of day	# of regressions during weeks 1-53	403	403	403
	% of positive coefficients	52.9 %	53.3 %	48.6 %
	z-test	*1.15*	*1.34*	*-0.55*
	total # of municipality/week observations	147,642	58,991	10,865
Length of day	# of regressions during weeks 1-11 and 41-53	172	172	172
	% of positive coefficients	53.5 %	55.8 %	50.0 %
	z-test	*0.91*	*1.52*	*0.00*
	total # of municipality/week observations	64,830	27,015	4,863

Panel B: Daily regressions with excess buy ratio as dependent variable

		Individual	Nonfinancial corporation	Financial corporation
Length of day	# of regressions during weeks 1-53	1918	1918	1916
	% of positive coefficients	51.9 %	51.1 %	47.5 %
	z-test	*1.64*	*0.96*	*-2.15***
	total # of municipality/week observations	501,265	150,588	22,588
Length of day	# of regressions during weeks 1-11 and 41-53	810	810	809
	% of positive coefficients	53.0 %	51.2 %	46.2 %
	z-test	*1.69**	*0.70*	*-2.14***
	total # of municipality/week observations	226,076	70,120	10,285

Appendix 12

Pure time-series regression

Table 3

Time series regressions for individual investors' buy ratios

The depended variable is buy ratio based on trade count, on a daily frequency. It is based on all trades of individual investors aggregated across the country. The specification is similar to column 1 in Table 3, but aggregating observations over entire country. Independent variables have no geographical variation. The calendar variables are self-explanatory dummies (see Table 3). The regression also contains dummies for each calendar month (except January), *t*-values for these variables are omitted for brevity. Asterisks mark statistical significance: *** for 1%, ** for 5%, and * for 10%.

Buy ratio as dependent variable	Individuals	Nonfinancial corporations	Financial corporations
Last 5 days of year	0.02	-0.01	-0.01
	1.01	-0.643	-0.764
First 5 days of year	0.05***	-0.01*	-0.01
	3.198	-1.733	-1.012
Monday or after holiday	-0.01*	-0.01***	0.00
	-1.657	-2.637	0.968
Friday or before holiday	-0.01**	-0.01***	0.00
	-2.459	-3.171	1.503
Last 3 and 1st day of month	0.00	-0.01**	-0.01**
	0.464	-2.551	-2.045
February	0.01	0.00	-0.01
March	0.01	0.01*	0.01
April	0.02**	0.00	0.01
May	-0.03***	0.01**	0.01
June	-0.02**	0.01**	0.01
July	0.02**	0.02***	-0.01
August	0.02**	0.03***	0.01
September	0.04***	0.04***	0.01*
October	0.03***	0.03***	0.01
November	0.00	0.02***	0.01*
December	0.01	0.03***	0.02**
Constant term	0.37***	0.46***	0.50***
	38.327	83.879	70.832
Year dummies	Yes	Yes	Yes
Number of observations	1,919	1,919	1,919
Adjusted R-squared	0.459	0.192	0.101