Appendix to Accompany
"Winter Blues: A SAD Stock Market Cycle"

In this Appendix, we provide the entire set of additional robustness checks mentioned throughout, but not included within, the original paper. The order in which the tables are presented corresponds to the order in which the results are mentioned in the original paper, with the exception of the table containing returns to various trading strategies, Table A10, which appears last and has its own notes.

Notes to Tables A1-A9: There are multiple parts and multiple pages to each table. In all cases, figures in parentheses are robust standard errors. Estimates marked with one, two, or three asterisks are significant at the 10 percent, 5 percent, or 1 percent level respectively. In Panel B of Table A3, we report the value of the log-likelihood function, the p-value from a χ^2 test for autoregressive conditional heteroskedasticity (ARCH) up to 10 lags, and the p-value from a χ^2 test for residual autocorrelation up to 10 lags. In Panel B of other tables we report the R^2 for each regression as well as the p-value from a χ^2 test for residual autocorrelation up to 10 lags. (Note that for some small-cap or equal-weighted indices, we were unable to eliminate evidence of residual autocorrelation with the simple model specifications adopted here. Likewise, with the maximum likelihood estimation, for some indices we were unable to eliminate evidence of ARCH or residual autocorrelation over the full samples.)

Legend:

Table A1: Sensitivity to Treatment of Holidays

All variables shown in this table are defined as in the original paper, as are the time periods for all data sets. In the original paper, zero return days which were actually holidays in a particular country were omitted. Here we omit *all* zero return days.

$$r_t = \mu + \rho_1 r_{t-1} + \rho_2 r_{t-2} + \mu_{Monday} D_t^{Monday} + \mu_{Tax} D_t^{Tax} + \mu_{SAD} SAD_t + \mu_{Fall} D_t^{Fall}$$
$$+\mu_{Cloud}\ Cloud_t + \mu_{Precipitation}\ Precipitation_t + \mu_{Temperature}\ Temperature_t + \epsilon_t$$

Part I of Table A1: US Indices

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	S&P 500 42^{o}N	NYSE 42^{o}N	NASDAQ 42^{o}N	AMEX 42^{o}N
μ	-0.054	0.012	-0.022	0.045
	(-.50)	(0.10)	(-.15)	(0.41)
ρ_1	0.060***	0.151***	0.144***	0.266***
	(3.34)	(5.92)	(4.89)	(8.72)
ρ_2	-0.040**	.	.	.
	(-2.2)	.	.	.
μ_{Monday}	-0.205***	-0.117***	-0.242***	-0.262***
	(-8.9)	(-4.8)	(-7.0)	(-12)
μ_{Tax}	0.061	0.008	0.063	0.179***
	(1.05)	(0.11)	(0.67)	(2.63)
μ_{SAD}	0.039***	0.026*	0.071***	0.036***
	(2.43)	(1.62)	(2.96)	(2.36)
μ_{Fall}	-0.059**	-0.040*	-0.134***	-0.084***
	(-2.2)	(-1.4)	(-3.3)	(-3.2)
μ_{Cloud}	0.121	0.048	0.088	0.024
	(0.76)	(0.28)	(0.40)	(0.15)
$\mu_{Precipitation}$	-0.002	-0.001	-0.003	-0.002
	(-.57)	(-.20)	(-.59)	(-.82)
$\mu_{Temperature}$	0.003**	0.000	0.003*	0.001
	(1.79)	(0.26)	(1.34)	(0.53)
	Panel B: Diagnostics			
R^2	0.010	0.027	0.032	0.089
AR(10) P-Value	0.321	0.852	0.180	0.017

Part II of Table A1: Sweden, Britain, Germany, and Canada

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	Sweden 59^{o}N	Britain 51^{o}N	Germany 50^{o}N	Canada 43^{o}N
μ	0.274*	0.220*	0.093	-0.068
	(1.42)	(1.29)	(0.65)	(-.50)
ρ_1	0.111***	0.061*	0.056***	0.154***
	(4.00)	(1.35)	(2.99)	(4.66)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.057	-0.117***	-0.143***	-0.125***
	(-1.2)	(-2.9)	(-4.5)	(-5.1)
μ_{Tax}	0.144	0.160**	0.166**	0.029
	(0.88)	(1.70)	(1.67)	(0.36)
μ_{SAD}	0.028**	0.030**	0.026*	0.052***
	(1.96)	(2.03)	(1.60)	(3.23)
μ_{Fall}	-0.114**	-0.036	-0.070**	-0.070**
	(-2.0)	(-.79)	(-1.9)	(-2.1)
μ_{Cloud}	-0.377	-0.257	-0.128	0.166
	(-1.3)	(-.97)	(-.52)	(0.61)
$\mu_{Precipitation}$	0.001	-0.017*	0.002	-0.003
	(0.09)	(-1.5)	(0.11)	(-.89)
$\mu_{Temperature}$	-0.001	-0.001	0.001	0.002
	(-.17)	(-.27)	(0.37)	(1.14)
	Panel B: Diagnostics			
R^2	0.018	0.009	0.008	0.030
AR(10) P-Value	0.121	0.178	0.023	0.624

Part III of Table A1: New Zealand, Japan, Australia, and South Africa

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	New Zealand 37^oS	Japan 36^oN	Australia 34^oS	South Africa 26^oS
μ	-0.304	0.005	0.107	-0.281*
	(-.56)	(0.04)	(0.48)	(-1.4)
ρ_1	.	.	0.090**	0.090***
	.	.	(1.94)	(3.68)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.207***	-0.055**	-0.038	-0.100***
	(-3.9)	(-1.9)	(-1.1)	(-2.3)
μ_{Tax}	0.198***	0.011	0.126*	0.011
	(2.57)	(0.14)	(1.59)	(0.10)
μ_{SAD}	0.049**	0.037*	0.029	0.114*
	(1.78)	(1.55)	(0.89)	(1.61)
μ_{Fall}	-0.149***	-0.060**	0.007	-0.033
	(-2.8)	(-1.9)	(0.22)	(-.86)
μ_{Cloud}	0.297	0.095	-0.331	0.140
	(0.38)	(0.59)	(-1.0)	(0.62)
$\mu_{Precipitation}$	0.001	-0.004	-0.005**	-0.001
	(0.40)	(-1.1)	(-2.2)	(-.25)
$\mu_{Temperature}$	0.010*	-0.001	0.005	0.016*
	(1.32)	(-.46)	(0.79)	(1.55)
	Panel B: Diagnostics			
R^2	0.011	0.002	0.010	0.010
AR(10) P-Value	0.945	0.010	0.179	0.041

Table A2: Sensitivity to Dividends and Index Weightings

All variables shown in this table are defined as in the original paper, as are the time periods for all data sets. Sensitivity of results to inclusion of dividends and to alternate weightings for the indices (equal-weighted, EW, and value-weighted, VW) is explored for four US indices: CRSP, NYSE, NASDAQ, and AMEX. Note that the case of value-weighted data without dividends is presented in the original paper for NYSE, NASDAQ, and AMEX, but not CRSP.

$$r_t = \mu + \rho_1 r_{t-1} + \rho_2 r_{t-2} + \mu_{Monday} D_t^{Monday} + \mu_{Tax} D_t^{Tax} + \mu_{SAD} SAD_t + \mu_{Fall} D_t^{Fall}$$
$$+ \mu_{Cloud}\, Cloud_t + \mu_{Precipitation}\, Precipitation_t + \mu_{Temperature}\, Temperature_t + \epsilon_t$$

Part I of Table A2: CRSP

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	CRSP EW Without Dividends 42^oN	CRSP EW With Dividends 42^oN	CRSP VW With Dividends 42^oN	CRSP VW Without Dividends 42^oN
μ	0.120*	0.122*	0.006	0.008
	(1.43)	(1.45)	(0.05)	(0.07)
ρ_1	0.362***	0.361***	0.159***	0.159***
	(12.7)	(12.7)	(7.34)	(7.36)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.289***	-0.282***	-0.129***	-0.138***
	(-15)	(-15)	(-5.3)	(-5.7)
μ_{Tax}	0.305***	0.302***	0.012	0.020
	(5.19)	(5.14)	(0.18)	(0.29)
μ_{SAD}	0.033***	0.034***	0.035**	0.033**
	(2.73)	(2.79)	(2.20)	(2.05)
μ_{Fall}	-0.097***	-0.097***	-0.053**	-0.053**
	(-4.6)	(-4.6)	(-1.9)	(-1.9)
μ_{Cloud}	-0.040	-0.036	0.059	0.046
	(-.32)	(-.29)	(0.35)	(0.27)
$\mu_{Precipitation}$	-0.003*	-0.003*	-0.001	-0.001
	(-1.3)	(-1.4)	(-.24)	(-.26)
$\mu_{Temperature}$	0.000	0.000	0.001	0.001
	(0.09)	(0.11)	(0.66)	(0.55)
	Panel B: Diagnostics			
R^2	0.168	0.167	0.030	0.031
AR(10) P-Value	<0.001	<0.001	0.888	0.900

Part II of Table A2: NYSE

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)		
Parameter	NYSE VW With Dividends 42^oN	NYSE EW With Dividends 42^oN	NYSE EW Without Dividends 42^oN
μ	0.010	0.043	0.041
	(0.09)	(0.44)	(0.42)
ρ_1	0.151***	0.298***	0.298***
	(5.90)	(11.8)	(11.9)
ρ_2	.	.	.
	.	.	.
μ_{Monday}	-0.108***	-0.200***	-0.210***
	(-4.4)	(-9.6)	(-10)
μ_{Tax}	-0.000	0.221***	0.226***
	(-.00)	(3.30)	(3.38)
μ_{SAD}	0.028**	0.033***	0.032***
	(1.77)	(2.45)	(2.35)
μ_{Fall}	-0.040*	-0.071***	-0.071***
	(-1.4)	(-2.9)	(-2.9)
μ_{Cloud}	0.062	0.042	0.034
	(0.36)	(0.28)	(0.23)
$\mu_{Precipitation}$	-0.001	-0.002	-0.002
	(-.18)	(-.97)	(-.96)
$\mu_{Temperature}$	0.001	0.001	0.001
	(0.37)	(0.44)	(0.38)

	Panel B: Diagnostics		
R^2	0.026	0.107	0.108
AR(10) P-Value	0.844	0.042	0.046

Part III of Table A2: NASDAQ

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)		
Parameter	NASDAQ VW With Dividends 42^oN	NASDAQ EW With Dividends 42^oN	NASDAQ EW Without Dividends 42^oN
μ	-0.020	0.144*	0.143*
	(-.13)	(1.59)	(1.57)
ρ_1	0.143***	0.360***	0.360***
	(4.88)	(9.47)	(9.49)
ρ_2	.	.	.
	.	.	.
μ_{Monday}	-0.235***	-0.333***	-0.339***
	(-6.8)	(-16)	(-16)
μ_{Tax}	0.059	0.272***	0.273***
	(0.63)	(4.23)	(4.25)
μ_{SAD}	0.072***	0.040***	0.040***
	(2.99)	(2.82)	(2.80)
μ_{Fall}	-0.134***	-0.131***	-0.131***
	(-3.3)	(-5.3)	(-5.3)
μ_{Cloud}	0.091	-0.027	-0.029
	(0.41)	(-.20)	(-.22)
$\mu_{Precipitation}$	-0.003	-0.004*	-0.004*
	(-.59)	(-1.6)	(-1.6)
$\mu_{Temperature}$	0.003*	0.000	0.000
	(1.35)	(0.08)	(0.08)

	Panel B: Diagnostics		
R^2	0.031	0.175	0.176
AR(10) P-Value	0.154	<0.001	<0.001

Part IV of Table A2: AMEX

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)		
Parameter	AMEX VW With Dividends 42^oN	AMEX EW With Dividends 42^oN	AMEX EW Without Dividends 42^oN
μ	0.040	0.171**	0.169**
	(0.37)	(1.85)	(1.83)
ρ_1	0.265***	0.375***	0.375***
	(8.69)	(10.3)	(10.4)
ρ_2	.	.	.
	.	.	.
μ_{Monday}	-0.255***	-0.310***	-0.315***
	(-11)	(-15)	(-15)
μ_{Tax}	0.174***	0.470***	0.472***
	(2.56)	(6.10)	(6.13)
μ_{SAD}	0.038***	0.029**	0.028**
	(2.49)	(2.26)	(2.19)
μ_{Fall}	-0.084***	-0.110***	-0.110***
	(-3.2)	(-4.8)	(-4.8)
μ_{Cloud}	0.037	-0.088	-0.092
	(0.23)	(-.64)	(-.66)
$\mu_{Precipitation}$	-0.002	-0.002	-0.002
	(-.83)	(-1.2)	(-1.2)
$\mu_{Temperature}$	0.001	-0.001	-0.001
	(0.61)	(-.41)	(-.44)

	Panel B: Diagnostics		
R^2	0.088	0.187	0.188
AR(10) P-Value	0.018	0.001	0.001

Table A3: Maximum Likelihood Estimation

With the exception of the following new variables, all variables in this table are defined as in the original paper. The conditional variance of ϵ_t is represented by h_t. The model accounts for autoregressive clustering of stock market return volatility with the ϵ_{t-1}^2 and h_{t-1} terms, and allows for asymmetric response to negative shocks (presumably leading to increased volatility in the next period) with the interactive dummy variable D_{t-1}. α is a constant term, and β, γ_1, and ϕ_1 are coefficients on the previously described variables that appear in the conditional variance expression. The time periods for all data sets are as stated in the original paper.

$$\begin{aligned} r_t = \quad & \mu + \rho r_{t-1} + \mu_{Mon} D_{Mon,t} + \mu_{Tax} D_{Tax,t} + \mu_{SAD} SAD_t + \mu_{Fall} Fall_t \\ & + \mu_{Cloud}\ Cloud_t + \mu_{Rain}\ Rain_t + \mu_{Temperature}\ Temperature_t + \epsilon_t\ ; \quad \epsilon_t \sim (0, h_t) \end{aligned}$$

$$h_t = \alpha + \beta_1 h_{t-1} + \gamma_1 \epsilon_{t-1}^2 + \phi_1 D_{t-1} \epsilon_{t-1}^2$$

$$D_{t-1} = \begin{cases} 1 & if\ \epsilon_{t-1} < 0 \\ 0 & otherwise \end{cases}$$

Part I of Table A3: US Indices

	Parameter Estimates (Bollerslev-Wooldridge Robust t-test)			
Parameter	S&P 500 42^{o}N	NYSE 42^{o}N	NASDAQ 42^{o}N	AMEX 42^{o}N
μ	-0.016	0.055	-0.023	-0.025
	(-.23)	(0.65)	(-.22)	(-.34)
ρ_1	0.139***	0.190***	0.289***	0.307***
	(17.1)	(16.6)	(21.7)	(26.6)
ρ_2	-0.028***	.	.	.
	(-3.6)	.	.	.
μ_{Monday}	-0.150***	-0.105***	-0.242***	-0.198***
	(-11)	(-6.5)	(-11)	(-14)
μ_{Tax}	-0.007	0.004	0.038	0.138***
	(-.13)	(0.08)	(0.52)	(2.65)
μ_{SAD}	0.015*	0.010	0.038**	0.030***
	(1.40)	(0.72)	(2.29)	(2.59)
μ_{Fall}	-0.010	-0.008	-0.056**	-0.047***
	(-.58)	(-.35)	(-2.0)	(-2.3)
$\mu_{Precipitation}$	-0.003	-0.002	-0.005**	-0.002
	(-1.2)	(-.90)	(-1.7)	(-1.1)
μ_{Cloud}	0.095	-0.024	0.134	0.123
	(0.90)	(-.19)	(0.89)	(1.16)
$\mu_{Temperature}$	0.001	-0.000	0.002*	0.001
	(1.16)	(-.00)	(1.31)	(0.96)
α	0.010***	0.009***	0.016***	0.014***
	(7.14)	(3.22)	(5.47)	(6.78)
β_1	0.911***	0.901***	0.866***	0.846***
	(163)	(63.6)	(72.6)	(72.5)
γ_1	0.038***	0.036***	0.065***	0.074***
	(6.59)	(3.94)	(5.70)	(7.16)
ϕ_1	0.089***	0.107***	0.101***	0.116***
	(7.23)	(6.98)	(5.10)	(6.44)
	Panel B: Diagnostics			
Log Likelihood	-24381.753	-10493.037	-8359.879	-9535.297
ARCH(10) P-Value	0.285	0.897	0.262	0.071
AR(10) P-Value	0.057	0.86	0.012	0.003

Part II of Table A3: Sweden, Britain, Germany and Canada

	Parameter Estimates (Bollerslev-Wooldridge Robust t-test)			
Parameter	Sweden 59^oN	Britain 51^oN	Germany 50^oN	Canada 43^oN
μ	0.150	0.116	-0.052	-0.203**
	(0.94)	(0.52)	(-.43)	(-1.8)
ρ_1	0.176***	0.068***	0.122***	0.239***
	(10.2)	(4.44)	(9.98)	(15.8)
ρ_2	.	.	.	.
		.	.	.
μ_{Monday}	-0.098***	-0.148***	-0.172***	-0.113***
	(-2.6)	(-4.5)	(-6.9)	(-5.7)
μ_{Tax}	0.361**	0.104	0.183***	-0.048
	(1.71)	(1.22)	(2.33)	(-.70)
μ_{SAD}	0.018*	0.017	0.029**	0.044***
	(1.56)	(0.90)	(2.26)	(3.78)
μ_{Fall}	-0.035	0.003	-0.043	-0.024
	(-.66)	(0.04)	(-1.2)	(-.81)
$\mu_{Precipitation}$	0.002	0.005	-0.005	-0.003*
	(0.16)	(0.30)	(-.63)	(-1.3)
μ_{Cloud}	-0.191	-0.121	0.049	0.474**
	(-.74)	(-.36)	(0.22)	(2.05)
$\mu_{Temperature}$	0.002	-0.001	0.005**	0.001
	(0.92)	(-.23)	(2.01)	(0.69)
α	0.066***	0.041***	0.027***	0.016***
	(3.36)	(3.38)	(4.80)	(4.43)
β_1	0.814***	0.866***	0.866***	0.864***
	(37.5)	(38.2)	(62.0)	(49.5)
γ_1	0.069***	0.045***	0.076***	0.100***
	(2.88)	(3.01)	(7.13)	(5.31)
ϕ_1	0.143***	0.091***	0.081***	0.029
	(4.79)	(2.45)	(2.73)	(1.16)
	Panel B: Diagnostics			
Log Likelihood	-7114.987	-9049.783	-12768.266	-8752.956
ARCH(10) P-Value	0.991	0.979	0.982	0.5
AR(10) P-Value	0.02	0.185	0.003	0.12

Panel III of Table A3: New Zealand, Japan, Australia and South Africa

	Parameter Estimates (Bollerslev-Wooldridge Robust t-test)			
Parameter	New Zealand 37^{o}S	Japan 36^{o}S	Australia 34^{o}N	South Africa 26^{o}S
μ	-0.401	0.116	0.196	-0.113
	(-.72)	(0.92)	(1.00)	(-.64)
ρ_1	.	.	0.179***	0.148***
	.	.	(12.2)	(10.0)
ρ_2	.	.	.	.
		.	.	.
μ_{Monday}	-0.152***	-0.018	-0.014	-0.111***
	(-3.2)	(-.84)	(-.45)	(-2.9)
μ_{Tax}	0.206***	0.118**	0.184**	0.028
	(2.88)	(2.10)	(2.32)	(0.29)
μ_{SAD}	0.048**	0.005	-0.030	0.054
	(1.83)	(0.22)	(-1.1)	(0.80)
μ_{Fall}	-0.145***	-0.021	0.007	-0.006
	(-2.9)	(-.76)	(0.22)	(-.17)
$\mu_{Precipitation}$	-0.001	-0.001	-0.003*	-0.005
	(-.29)	(-.37)	(-1.5)	(-1.1)
μ_{Cloud}	0.542	-0.010	-0.102	0.152
	(0.67)	(-.07)	(-.32)	(0.73)
$\mu_{Temperature}$	0.006	-0.003**	-0.005	0.007
	(0.78)	(-1.7)	(-.87)	(0.86)
α	0.121***	0.033***	0.117***	0.110***
	(3.61)	(6.40)	(4.60)	(3.09)
β_1	0.681***	0.819***	0.662***	0.812***
	(9.69)	(49.8)	(8.65)	(31.6)
γ_1	0.128***	0.097***	0.112***	0.100***
	(3.93)	(6.71)	(3.69)	(4.31)
ϕ_1	0.128**	0.141***	0.193*	0.058*
	(1.97)	(5.10)	(1.56)	(1.56)
	Panel B: Diagnostics			
Log Likelihood	-3411.242	-17347.207	-6932.024	-11902.88
ARCH(10) P-Value	0.646	0.675	0.322	0.998
AR(10) P-Value	0.996	0.002	0.096	0.244

Table A4: Sensitivity to Definition of SAD Variable: SAD_t Rescaled to Vary Between 0 and 1

All variables shown in this table are defined as in the original paper, with the exception of $SAD_{0to1,t}$ which has been scaled to vary between 0 and 1 for each index as follows: $SAD_{0to1,t} = 1 - (H_t - Hmin)/(Hmax - Hmin)$ during the fall and winter and zero otherwise, where H_t is the time from sunset to sunrise at a particular location, $Hmin$ is the minimum value of H_t observed during the year for the index, and $Hmax$ is the maximum annual value of H_t.. The time periods for all data sets are as stated in the original paper.

$$r_t = \mu + \rho_1 r_{t-1} + \rho_2 r_{t-2} + \mu_{Monday} D_t^{Monday} + \mu_{Tax} D_t^{Tax} + \mu_{SAD_{0to1}} SAD_{0to1,t} + \mu_{Fall} D_t^{Fall}$$
$$+\mu_{Cloud}\ Cloud_t + \mu_{Precipitation}\ Precipitation_t + \mu_{Temperature}\ Temperature_t + \epsilon_t$$

Part I of Table A4: US Indices

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	S&P 500 42^{o}N	NYSE 42^{o}N	NASDAQ 42^{o}N	AMEX 42^{o}N
μ	-0.111	0.004	-0.042	0.053
	(-.94)	(0.03)	(-.25)	(0.42)
ρ_1	0.062***	0.151***	0.144***	0.266***
	(3.51)	(5.92)	(4.89)	(8.72)
ρ_2	-0.043***	.	.	.
	(-2.4)	.	.	.
μ_{Monday}	-0.201***	-0.117***	-0.242***	-0.262***
	(-8.9)	(-4.8)	(-7.0)	(-12)
μ_{Tax}	0.068	0.015	0.084	0.191***
	(1.21)	(0.22)	(0.91)	(2.84)
$\mu_{SAD_{0to1}}$	0.144***	0.078*	0.211***	0.095**
	(2.77)	(1.41)	(2.50)	(1.73)
μ_{Fall}	-0.082***	-0.050**	-0.162***	-0.095***
	(-3.0)	(-1.7)	(-3.6)	(-3.4)
μ_{Cloud}	0.160	0.043	0.075	-0.001
	(0.99)	(0.24)	(0.33)	(-.01)
$\mu_{Precipitation}$	-0.002	-0.001	-0.003	-0.002
	(-.54)	(-.18)	(-.58)	(-.81)
$\mu_{Temperature}$	0.005**	0.001	0.004*	0.001
	(2.19)	(0.36)	(1.28)	(0.42)

	Panel B: Diagnostics			
R^2	0.011	0.026	0.031	0.088
AR(10) P-Value	0.097	0.853	0.229	0.019

Part II of Table A4: Sweden, Britain, Germany, and Canada

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	Sweden 59^{o}N	Britain 51^{o}N	Germany 50^{o}N	Canada 43^{o}N
μ	0.201	0.197	0.059	-0.111
	(0.97)	(1.14)	(0.39)	(-.70)
ρ_1	0.110***	0.060*	0.057***	0.152***
	(3.94)	(1.33)	(3.02)	(4.62)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.056	-0.116***	-0.142***	-0.123***
	(-1.2)	(-2.9)	(-4.5)	(-5.1)
μ_{Tax}	0.154	0.176**	0.170**	0.047
	(0.98)	(1.86)	(1.75)	(0.59)
$\mu_{SAD_{0to1}}$	0.185**	0.171***	0.120**	0.173***
	(2.01)	(2.64)	(1.71)	(2.77)
μ_{Fall}	-0.139**	-0.069*	-0.089**	-0.091***
	(-2.3)	(-1.4)	(-2.2)	(-2.8)
μ_{Cloud}	-0.301	-0.306	-0.113	0.209
	(-.99)	(-1.2)	(-.46)	(0.71)
$\mu_{Precipitation}$	0.002	-0.016*	0.002	-0.003
	(0.12)	(-1.5)	(0.15)	(-.87)
$\mu_{Temperature}$	0.001	0.002	0.002	0.003*
	(0.23)	(0.42)	(0.66)	(1.48)
	Panel B: Diagnostics			
R^2	0.017	0.010	0.008	0.029
AR(10) P-Value	0.128	0.229	0.028	0.136

Part III of Table A4: New Zealand, Japan, Australia, and South Africa

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	New Zealand 37^{o}S	Japan 36^{o}N	Australia 34^{o}S	South Africa 26^{o}S
μ	-0.122	0.082	0.081	0.075
	(-.22)	(0.63)	(0.33)	(0.37)
ρ_1	.	.	0.089**	0.089***
	.	.	(1.94)	(3.64)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.207***	-0.054**	-0.038	-0.098***
	(-3.8)	(-1.9)	(-1.1)	(-2.4)
μ_{Tax}	0.177**	0.032	0.132**	-0.005
	(2.32)	(0.41)	(1.71)	(-.05)
$\mu_{SAD0to1}$	0.040	0.044	0.063	-0.054
	(0.57)	(0.74)	(0.78)	(-.43)
μ_{Fall}	-0.115**	-0.053*	0.001	0.010
	(-2.1)	(-1.5)	(0.03)	(0.23)
μ_{Cloud}	0.148	0.015	-0.296	-0.136
	(0.19)	(0.10)	(-.93)	(-.52)
$\mu_{Precipitation}$	0.002	-0.004	-0.005**	-0.002
	(0.63)	(-1.2)	(-2.2)	(-.29)
$\mu_{Temperature}$	0.005	-0.002	0.006	0.004
	(0.64)	(-.78)	(0.75)	(0.47)
	Panel B: Diagnostics			
R^2	0.010	0.002	0.010	0.009
AR(10) P-Value	0.972	0.011	0.154	0.067

Table A5: Sensitivity to Definition of SAD Variable: SAD_t Rescaled to Vary Between -1 and +1

All variables shown in this table are defined as in the original paper with the exception of $SAD_{-1to+1,t}$ which has been scaled to vary between -1 and +1 for each index as follows: $SAD_{-1to+1,t} = [2 * (1 - (H_t - Hmin)/(Hmax - Hmin))] - 1$ during the fall and winter and zero otherwise, where H_t is the time from sunset to sunrise at a particular location, $Hmin$ is the minimum value of H_t observed during the year for the index, and $Hmax$ is the maximum annual value of H_t. The time periods for all data sets are as stated in the original paper.

$$r_t = \mu + \rho_1 r_{t-1} + \rho_2 r_{t-2} + \mu_{Monday} D_t^{Monday} + \mu_{Tax} D_t^{Tax} + \mu_{SAD_{-1to+1}} SAD_{-1to+1,t} + \mu_{Fall} D_t^{Fall}$$
$$+\mu_{Cloud}\ Cloud_t + \mu_{Precipitation}\ Precipitation_t + \mu_{Temperature}\ Temperature_t + \epsilon_t$$

Part I of Table A5: US Indices

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	S&P 500 42^oN	NYSE 42^oN	NASDAQ 42^oN	AMEX 42^oN
μ	-0.066	0.006	-0.037	0.037
	(-.60)	(0.05)	(-.24)	(0.34)
ρ_1	0.062***	0.151***	0.144***	0.266***
	(3.51)	(5.92)	(4.89)	(8.72)
ρ_2	-0.043***	.	.	.
	(-2.4)	.	.	.
μ_{Monday}	-0.201***	-0.117***	-0.242***	-0.262***
	(-8.9)	(-4.8)	(-7.0)	(-12)
μ_{Tax}	0.060	0.007	0.062	0.179***
	(1.05)	(0.11)	(0.66)	(2.63)
$\mu_{SAD_{-1to+1,t}}$	0.123***	0.081*	0.221***	0.111***
	(2.52)	(1.63)	(2.99)	(2.37)
μ_{Fall}	-0.060**	-0.041*	-0.138***	-0.086***
	(-2.3)	(-1.4)	(-3.3)	(-3.2)
μ_{Cloud}	0.131	0.053	0.102	0.030
	(0.82)	(0.31)	(0.46)	(0.18)
$\mu_{Precipitation}$	-0.002	-0.001	-0.003	-0.002
	(-.56)	(-.19)	(-.58)	(-.82)
$\mu_{Temperature}$	0.003**	0.001	0.004*	0.001
	(1.90)	(0.32)	(1.43)	(0.61)
	Panel B: Diagnostics			
R^2	0.011	0.027	0.032	0.089
AR(10) P-Value	0.087	0.851	0.186	0.017

Part II of Table A5: Sweden, Britain, Germany, and Canada

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	Sweden 59^{o}N	Britain 51^{o}N	Germany 50^{o}N	Canada 43^{o}N
μ	0.265*	0.216	0.089	-0.079
	(1.38)	(1.27)	(0.62)	(-.58)
ρ_1	0.110***	0.060*	0.057***	0.152***
	(3.94)	(1.33)	(3.02)	(4.62)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.056	-0.117***	-0.142***	-0.123***
	(-1.2)	(-2.9)	(-4.5)	(-5.1)
μ_{Tax}	0.136	0.162**	0.163**	0.029
	(0.85)	(1.72)	(1.65)	(0.36)
$\mu_{SAD_{-1to+1,t}}$	0.174**	0.133**	0.107*	0.168***
	(1.99)	(2.08)	(1.63)	(3.27)
μ_{Fall}	-0.115**	-0.038	-0.072**	-0.072**
	(-2.0)	(-.83)	(-1.9)	(-2.2)
μ_{Cloud}	-0.367	-0.258	-0.126	0.181
	(-1.3)	(-.98)	(-.51)	(0.67)
$\mu_{Precipitation}$	0.001	-0.017*	0.001	-0.003
	(0.08)	(-1.5)	(0.11)	(-.88)
$\mu_{Temperature}$	-0.000	-0.001	0.001	0.002
	(-.12)	(-.21)	(0.41)	(1.26)
	Panel B: Diagnostics			
R^2	0.017	0.009	0.008	0.029
AR(10) P-Value	0.129	0.227	0.026	0.108

Part III of Table A5: New Zealand, Japan, Australia, and South Africa

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	New Zealand 37^oS	Japan 36^oN	Australia 34^oS	South Africa 26^oS
μ	-0.292	0.007	0.100	-0.253
	(-.53)	(0.05)	(0.45)	(-1.2)
ρ_1	.	.	0.089**	0.088***
	.	.	(1.94)	(3.63)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.207***	-0.054**	-0.038	-0.098***
	(-3.8)	(-1.9)	(-1.1)	(-2.4)
μ_{Tax}	0.195***	0.012	0.124*	0.011
	(2.54)	(0.15)	(1.59)	(0.11)
$\mu_{SAD_{-1to+1,t}}$	0.114**	0.087*	0.066	0.158*
	(1.68)	(1.51)	(0.90)	(1.38)
μ_{Fall}	-0.147***	-0.061**	0.006	-0.033
	(-2.8)	(-1.9)	(0.17)	(-.87)
μ_{Cloud}	0.286	0.091	-0.327	0.132
	(0.36)	(0.56)	(-1.0)	(0.57)
$\mu_{Precipitation}$	0.001	-0.004	-0.005**	-0.001
	(0.42)	(-1.1)	(-2.2)	(-.24)
$\mu_{Temperature}$	0.010	-0.001	0.006	0.014*
	(1.27)	(-.43)	(0.81)	(1.41)
	Panel B: Diagnostics			
R^2	0.011	0.002	0.010	0.009
AR(10) P-Value	0.971	0.011	0.157	0.074

Table A6: Sensitivity to Definition of SAD variable: Year-Long SAD Effect

All variables shown in this table are defined as in the original paper, with the exception of $SAD_{c,t}$ (which equals $H_t - 12$ during all four seasons). The time periods for all data sets are as stated in the original paper.

$$r_t = \mu + \rho_1 r_{t-1} + \rho_2 r_{t-2} + \mu_{Monday} D_t^{Monday} + \mu_{Tax} D_t^{Tax} + \mu_{SAD_c} SAD_{c,t} + \mu_{Fall} D_t^{Fall}$$

$$+\mu_{Cloud}\, Cloud_t + \mu_{Precipitation}\, Precipitation_t + \mu_{Temperature}\, Temperature_t + \epsilon_t$$

Part I of Table A6: US Indices

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	S&P 500 42^oN	NYSE 42^oN	NASDAQ 42^oN	AMEX 42^oN
μ	0.055	-0.010	0.029	0.030
	(0.45)	(-.07)	(0.17)	(0.23)
ρ_1	0.063***	0.151***	0.144***	0.266***
	(3.52)	(5.91)	(4.91)	(8.72)
ρ_2	-0.042***	.	.	.
	(-2.4)	.	.	.
μ_{Monday}	-0.201***	-0.117***	-0.242***	-0.262***
	(-8.9)	(-4.8)	(-7.0)	(-12)
μ_{Tax}	0.086*	0.018	0.099	0.194***
	(1.51)	(0.27)	(1.07)	(2.89)
μ_{SAD_c}	0.010	0.020*	0.038**	0.025**
	(0.76)	(1.42)	(2.02)	(1.92)
μ_{Fall}	-0.050**	-0.050**	-0.142***	-0.096***
	(-1.8)	(-1.7)	(-3.2)	(-3.6)
μ_{Cloud}	0.013	0.108	0.102	0.086
	(0.07)	(0.50)	(0.40)	(0.42)
$\mu_{Precipitation}$	-0.002	-0.001	-0.003	-0.002
	(-.64)	(-.21)	(-.63)	(-.84)
$\mu_{Temperature}$	0.001	0.002	0.004	0.003
	(0.53)	(0.65)	(1.09)	(0.90)
	Panel B: Diagnostics			
R^2	0.010	0.027	0.031	0.089
AR(10) P-Value	0.095	0.852	0.220	0.018

Part II of Table A6: Sweden, Britain, Germany, and Canada

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	Sweden 59^{o}N	Britain 51^{o}N	Germany 50^{o}N	Canada 43^{o}N
μ	0.397**	0.267*	0.168	-0.044
	(2.09)	(1.58)	(1.20)	(-.23)
ρ_1	0.110***	0.061*	0.057***	0.153***
	(3.97)	(1.34)	(3.04)	(4.65)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.056	-0.116***	-0.142***	-0.124***
	(-1.2)	(-2.9)	(-4.5)	(-5.1)
μ_{Tax}	0.200	0.137*	0.196**	0.067
	(1.27)	(1.47)	(2.01)	(0.84)
μ_{SAD_c}	0.004	0.012*	0.006	0.024*
	(0.37)	(1.31)	(0.51)	(1.30)
μ_{Fall}	-0.073	-0.029	-0.054*	-0.063**
	(-1.2)	(-.62)	(-1.3)	(-2.0)
μ_{Cloud}	-0.491*	-0.255	-0.186	0.223
	(-1.6)	(-.97)	(-.76)	(0.55)
$\mu_{Precipitation}$	0.005	-0.016*	0.002	-0.003
	(0.29)	(-1.5)	(0.18)	(-.86)
$\mu_{Temperature}$	-0.004	-0.002	-0.001	0.001
	(-.89)	(-.45)	(-.16)	(0.61)
	Panel B: Diagnostics			
R^2	0.017	0.009	0.008	0.028
AR(10) P-Value	0.104	0.226	0.026	0.137

Part III of Table A6: New Zealand, Japan, Australia, South Africa

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	New Zealand 37^{o}S	Japan 36^{o}N	Australia 34^{o}S	South Africa 26^{o}S
μ	-0.185	0.072	0.131	0.045
	(-.33)	(0.53)	(0.56)	(0.30)
ρ_1	.	.	0.089**	0.089***
	.	.	(1.94)	(3.64)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.207***	-0.054**	-0.038	-0.098***
	(-3.8)	(-1.9)	(-1.1)	(-2.4)
μ_{Tax}	0.177**	0.034	0.140**	0.008
	(2.33)	(0.44)	(1.83)	(0.07)
μ_{SAD_c}	0.015	0.011	0.011	-0.018
	(0.85)	(0.77)	(0.55)	(-.40)
μ_{Fall}	-0.122**	-0.051*	0.015	0.005
	(-2.3)	(-1.5)	(0.42)	(0.13)
μ_{Cloud}	0.237	0.053	-0.287	-0.131
	(0.30)	(0.30)	(-.90)	(-.50)
$\mu_{Precipitation}$	0.002	-0.004	-0.005**	-0.002
	(0.56)	(-1.3)	(-2.2)	(-.31)
$\mu_{Temperature}$	0.007	-0.002	0.004	0.005
	(0.83)	(-.65)	(0.54)	(0.53)
	Panel B: Diagnostics			
R^2	0.010	0.002	0.010	0.009
AR(10) P-Value	0.972	0.011	0.153	0.070

Table A7: Sensitivity to Definition of SAD Variable: Splitting the Fall and Winter SAD Effects

All variables shown in this table are defined as in the original paper, with the exception of $SAD_{a,t}$ (which equals $H_t - 12$ during the winter and equals zero otherwise) and $SAD_{b,t}$ (which equals $H_t - 12$ during the fall and equals zero otherwise). There is no Fall dummy variable included in the model specification for this table. The time periods for all data sets are as stated in the original paper.

$$r_t = \mu + \rho_1 r_{t-1} + \rho_2 r_{t-2} + \mu_{Monday} D_t^{Monday} + \mu_{Tax} D_t^{Tax} + \mu_{SAD_a} SAD_{a,t} + \mu_{SAD_b} SAD_{b,t}$$
$$+\mu_{Cloud}\ Cloud_t + \mu_{Precipitation}\ Precipitation_t + \mu_{Temperature}\ Temperature_t + \epsilon_t$$

Part I of Table A7: US Indices

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	S&P 500 42^{o}N	NYSE 42^{o}N	NASDAQ 42^{o}N	AMEX 42^{o}N
μ	-0.139*	-0.041	-0.194*	-0.068
	(-1.3)	(-.37)	(-1.3)	(-.66)
ρ_1	0.062***	0.151***	0.144***	0.266***
	(3.51)	(5.92)	(4.88)	(8.70)
ρ_2	-0.042***	.	.	.
	(-2.4)	.	.	.
μ_{Monday}	-0.201***	-0.117***	-0.242***	-0.262***
	(-8.9)	(-4.8)	(-7.0)	(-12)
μ_{Tax}	0.049	0.001	0.036	0.165***
	(0.85)	(0.02)	(0.37)	(2.41)
μ_{SAD_a}	0.054***	0.035**	0.102***	0.055***
	(3.02)	(1.88)	(3.69)	(3.14)
μ_{SAD_b}	0.021*	0.014	0.029	0.010
	(1.40)	(0.85)	(1.20)	(0.65)
μ_{Cloud}	0.234*	0.120	0.318*	0.177
	(1.52)	(0.76)	(1.53)	(1.18)
$\mu_{Precipitation}$	-0.002	-0.001	-0.002	-0.002
	(-.50)	(-.17)	(-.54)	(-.74)
$\mu_{Temperature}$	0.004**	0.001	0.006**	0.002
	(2.27)	(0.56)	(2.02)	(1.21)

	Panel B: Diagnostics			
R^2	0.011	0.027	0.032	0.089
AR(10) P-Value	0.076	0.854	0.191	0.016

Part II of Table A7: Sweden, Britain, Germany, and Canada

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	Sweden 59^{o}N	Britain 51^{o}N	Germany 50^{o}N	Canada 43^{o}N
μ	0.199	0.215	0.082	-0.141
	(1.02)	(1.25)	(0.57)	(-1.1)
ρ_1	0.110***	0.060*	0.057***	0.153***
	(3.95)	(1.33)	(3.02)	(4.62)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.056	-0.117***	-0.142***	-0.123***
	(-1.2)	(-2.9)	(-4.5)	(-5.1)
μ_{Tax}	0.115	0.165**	0.143*	0.022
	(0.71)	(1.75)	(1.42)	(0.27)
μ_{SAD_a}	0.036**	0.037**	0.034**	0.062***
	(2.26)	(2.29)	(1.93)	(3.27)
μ_{SAD_b}	0.005	0.017*	0.003	0.030**
	(0.43)	(1.28)	(0.25)	(1.76)
μ_{Cloud}	-0.281	-0.265	-0.132	0.300
	(-.95)	(-1.0)	(-.54)	(1.22)
$\mu_{Precipitation}$	0.000	-0.017*	0.002	-0.003
	(0.03)	(-1.5)	(0.14)	(-.88)
$\mu_{Temperature}$	-0.000	-0.001	0.001	0.002
	(-.02)	(-.15)	(0.50)	(1.15)
	Panel B: Diagnostics			
R^2	0.017	0.009	0.008	0.029
AR(10) P-Value	0.123	0.231	0.025	0.077

Part III of Table A7: New Zealand, Japan, Australia, and South Africa

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	New Zealand 37^{o}S	Japan 36^{o}N	Australia 34^{o}S	South Africa 26^{o}S
μ	-0.436	0.019	0.044	-0.269*
	(-.78)	(0.14)	(0.19)	(-1.4)
ρ_1	.	.	0.089**	0.088***
	.	.	(1.93)	(3.63)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.207***	-0.055**	-0.038	-0.098***
	(-3.8)	(-1.9)	(-1.1)	(-2.4)
μ_{Tax}	0.127**	-0.025	0.092	0.013
	(1.79)	(-.30)	(1.15)	(0.13)
μ_{SAD_a}	0.052**	0.058**	0.051*	0.110*
	(1.78)	(2.26)	(1.47)	(1.49)
μ_{SAD_b}	-0.012	-0.002	0.028	0.090*
	(-.51)	(-.10)	(1.06)	(1.38)
μ_{Cloud}	0.497	0.053	-0.308	0.143
	(0.62)	(0.33)	(-.96)	(0.64)
$\mu_{Precipitation}$	0.001	-0.004	-0.005**	-0.001
	(0.38)	(-1.2)	(-2.1)	(-.25)
$\mu_{Temperature}$	0.010*	-0.001	0.008	0.015*
	(1.33)	(-.24)	(1.16)	(1.47)
	Panel B: Diagnostics			
R^2	0.010	0.002	0.010	0.009
AR(10) P-Value	0.970	0.011	0.173	0.076

Table A8: Sensitivity to Definition of SAD Variable: Equinox Break-Points

All variables shown in this table are defined as in the original paper, with the exception of $SAD_{d,t}$ (which equals $H_t - 12$ during the fall and winter and equals zero otherwise) and $SAD_{e,t}$ (which equals $H_t - 12$ during the spring and summer and equals zero otherwise). There is no Fall dummy variable included in the model specification for this table. The time periods for all data sets are as stated in the original paper.

$$r_t = \mu + \rho_1 r_{t-1} + \rho_2 r_{t-2} + \mu_{Monday} D_t^{Monday} + \mu_{Tax} D_t^{Tax} + \mu_{SAD_d} SAD_{d,t} + \mu_{SAD_e} SAD_{e,t}$$

$$+\mu_{Cloud}\, Cloud_t + \mu_{Precipitation}\, Precipitation_t + \mu_{Temperature}\, Temperature_t + \epsilon_t$$

Part I of Table A8: US Indices

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
μ	0.015	-0.014	-0.014	0.038
	(0.11)	(-.09)	(-.08)	(0.27)
ρ_1	0.062***	0.151***	0.145***	0.267***
	(3.52)	(5.92)	(4.93)	(8.74)
ρ_2	-0.042***	.	.	.
	(-2.4)	.	.	.
μ_{Monday}	-0.201***	-0.117***	-0.242***	-0.262***
	(-8.9)	(-4.8)	(-7.0)	(-12)
μ_{Tax}	0.089*	0.034	0.139*	0.229***
	(1.60)	(0.51)	(1.52)	(3.44)
μ_{SAD_d}	0.020	0.017	0.037*	0.014
	(1.24)	(0.96)	(1.53)	(0.86)
μ_{SAD_e}	-0.019*	-0.000	-0.021	-0.010
	(-1.4)	(-.00)	(-1.0)	(-.68)
μ_{Cloud}	0.032	0.103	0.121	0.065
	(0.17)	(0.46)	(0.47)	(0.31)
$\mu_{Precipitation}$	-0.002	-0.001	-0.003	-0.002
	(-.56)	(-.20)	(-.58)	(-.84)
$\mu_{Temperature}$	-0.000	0.000	-0.001	-0.001
	(-.07)	(0.02)	(-.13)	(-.42)
	Panel B: Diagnostics			
R^2	0.011	0.026	0.030	0.088
AR(10) P-Value	0.083	0.846	0.053	0.018

Part II of Table A8: Sweden, Britain, Germany, and Canada

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	Sweden 59^{o}N	Britain 51^{o}N	Germany 50^{o}N	Canada 43^{o}N
μ	0.363**	0.216	0.171	-0.011
	(1.90)	(1.26)	(1.24)	(-.06)
ρ_1	0.110***	0.060*	0.057***	0.153***
	(3.94)	(1.33)	(3.04)	(4.64)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.057	-0.116***	-0.142***	-0.123***
	(-1.2)	(-2.9)	(-4.5)	(-5.1)
μ_{Tax}	0.188	0.165**	0.207**	0.064
	(1.19)	(1.74)	(2.13)	(0.81)
μ_{SAD_d}	0.016*	0.027**	0.010	0.031**
	(1.34)	(1.98)	(0.77)	(1.75)
μ_{SAD_e}	-0.027**	-0.009	-0.016*	-0.022
	(-2.2)	(-.67)	(-1.3)	(-1.0)
μ_{Cloud}	-0.561**	-0.243	-0.233	0.041
	(-1.9)	(-.93)	(-.97)	(0.10)
$\mu_{Precipitation}$	0.003	-0.017*	0.001	-0.003
	(0.22)	(-1.5)	(0.07)	(-.87)
$\mu_{Temperature}$	-0.007**	-0.003	-0.003	-0.001
	(-1.8)	(-.72)	(-.81)	(-.58)
	Panel B: Diagnostics			
R^2	0.017	0.009	0.008	0.029
AR(10) P-Value	0.122	0.218	0.023	0.055

Part III of Table A8: New Zealand, Japan, Australia, and South Africa

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	New Zealand 37^{o}S	Japan 36^{o}N	Australia 34^{o}S	South Africa 26^{o}S
μ	-0.118	0.081	0.111	-0.177
	(-.21)	(0.58)	(0.51)	(-.93)
ρ_1	.	.	0.089**	0.088***
	.	.	(1.94)	(3.61)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.207***	-0.054**	-0.038	-0.098***
	(-3.8)	(-1.9)	(-1.1)	(-2.4)
μ_{Tax}	0.132**	0.046	0.119*	0.036
	(1.80)	(0.60)	(1.57)	(0.34)
μ_{SAD_d}	0.035*	0.014	0.033	0.075
	(1.36)	(0.72)	(1.18)	(1.15)
μ_{SAD_e}	-0.049**	-0.017	-0.003	-0.064*
	(-1.7)	(-1.1)	(-.16)	(-1.4)
μ_{Cloud}	0.093	0.027	-0.347	-0.081
	(0.12)	(0.16)	(-1.1)	(-.31)
$\mu_{Precipitation}$	0.002	-0.004	-0.005**	-0.002
	(0.72)	(-1.2)	(-2.1)	(-.35)
$\mu_{Temperature}$	0.002	-0.004*	0.005	0.013*
	(0.29)	(-1.5)	(0.88)	(1.36)
	Panel B: Diagnostics			
R^2	0.009	0.002	0.010	0.009
AR(10) P-Value	0.974	0.011	0.173	0.078

Table A9: Sensitivity to Definition of Tax-Year Dummy Variable

All variables shown in this table are defined as in the original paper, with the exception of the tax-year dummy variable which is set to equal 1 for the entire month in which the tax year begins in a particular country. The time periods for all data sets are as stated in the original paper.

$$r_t = \mu + \rho_1 r_{t-1} + \rho_2 r_{t-2} + \mu_{Monday} D_t^{Monday} + \mu_{Tax} D_t^{Tax} + \mu_{SAD} SAD_t + \mu_{Fall} D_t^{Fall}$$

$$+\mu_{Cloud}\, Cloud_t + \mu_{Precipitation}\, Precipitation_t + \mu_{Temperature}\, Temperature_t + \epsilon_t$$

Part I of Table A9: US Indices

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	S&P 500 42^oN	NYSE 42^oN	NASDAQ 42^oN	AMEX 42^oN
μ	-0.043	0.020	-0.001	0.077
	(-.38)	(0.16)	(-.00)	(0.65)
ρ_1	0.063***	0.151***	0.144***	0.267***
	(3.52)	(5.92)	(4.89)	(8.78)
ρ_2	-0.042***	.	.	.
	(-2.4)	.	.	.
μ_{Monday}	-0.201***	-0.117***	-0.242***	-0.262***
	(-8.9)	(-4.8)	(-7.0)	(-12)
μ_{Tax}	-0.005	-0.009	-0.020	-0.019
	(-.14)	(-.21)	(-.33)	(-.47)
μ_{SAD}	0.042***	0.027**	0.076***	0.047***
	(2.67)	(1.71)	(3.19)	(3.14)
μ_{Fall}	-0.066**	-0.044*	-0.148***	-0.111***
	(-2.2)	(-1.3)	(-3.2)	(-3.6)
μ_{Cloud}	0.100	0.036	0.054	-0.032
	(0.59)	(0.19)	(0.23)	(-.18)
$\mu_{Precipitation}$	-0.002	-0.001	-0.003	-0.002
	(-.57)	(-.20)	(-.58)	(-.83)
$\mu_{Temperature}$	0.003**	0.000	0.003	0.001
	(1.74)	(0.21)	(1.25)	(0.45)
	Panel B: Diagnostics			
R^2	0.011	0.027	0.032	0.088
AR(10) P-Value	0.072	0.855	0.171	0.008

Part II of Table A9: Sweden, Britain, Germany, and Canada

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	Sweden 59^{o}N	Britain 51^{o}N	Germany 50^{o}N	Canada 43^{o}N
μ	0.299*	0.208	0.063	-0.030
	(1.54)	(1.19)	(0.44)	(-.21)
ρ_1	0.110***	0.060*	0.057***	0.152***
	(3.97)	(1.34)	(3.04)	(4.62)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.054	-0.116***	-0.142***	-0.123***
	(-1.1)	(-2.9)	(-4.5)	(-5.1)
μ_{Tax}	-0.058	0.061	-0.023	-0.068*
	(-.65)	(1.07)	(-.41)	(-1.5)
μ_{SAD}	0.037***	0.032**	0.038**	0.063***
	(2.49)	(2.00)	(2.25)	(3.92)
μ_{Fall}	-0.146***	-0.036	-0.097***	-0.097***
	(-2.4)	(-.80)	(-2.4)	(-2.6)
μ_{Cloud}	-0.424*	-0.247	-0.088	0.088
	(-1.4)	(-.93)	(-.36)	(0.31)
$\mu_{Precipitation}$	0.002	-0.017*	0.001	-0.003
	(0.11)	(-1.5)	(0.09)	(-.88)
$\mu_{Temperature}$	-0.000	-0.001	0.002	0.002
	(-.10)	(-.18)	(0.56)	(1.23)
	Panel B: Diagnostics			
R^2	0.017	0.009	0.008	0.030
AR(10) P-Value	0.137	0.231	0.022	0.166

Part III of Table A9: New Zealand, Japan, Australia, and South Africa

	Panel A: Parameter Estimates (Heteroskedasticity Robust t-tests)			
Parameter	New Zealand 37^{o}S	Japan 36^{o}N	Australia 34^{o}S	South Africa 26^{o}S
μ	-0.252	0.038	0.103	-0.290*
	(-.46)	(0.28)	(0.47)	(-1.5)
ρ_1	.	.	0.089**	0.088***
	.	.	(1.94)	(3.62)
ρ_2	.	.	.	.
	.	.	.	.
μ_{Monday}	-0.207***	-0.055**	-0.038	-0.098***
	(-3.9)	(-2.0)	(-1.1)	(-2.4)
μ_{Tax}	0.215***	0.134***	0.071*	0.046
	(2.64)	(2.79)	(1.49)	(0.79)
μ_{SAD}	0.049**	0.006	0.023	0.121**
	(1.79)	(0.25)	(0.70)	(1.70)
μ_{Fall}	-0.156***	-0.019	0.018	-0.040
	(-2.9)	(-.55)	(0.48)	(-1.1)
μ_{Cloud}	0.217	0.055	-0.338	0.147
	(0.28)	(0.34)	(-1.0)	(0.65)
$\mu_{Precipitation}$	0.001	-0.004	-0.005**	-0.001
	(0.39)	(-1.2)	(-2.1)	(-.26)
$\mu_{Temperature}$	0.010*	-0.001	0.006	0.016*
	(1.31)	(-.60)	(0.86)	(1.56)
	Panel B: Diagnostics			
R^2	0.011	0.002	0.010	0.009
AR(10) P-Value	0.971	0.011	0.242	0.075

Table A10: Seasonal Returns and the Gains to Trading Strategies Across Hemispheres: The SAD Effect

Panel A: Seasonal Percentage Returns Across Countries

Index	Summer Return	Summer Std. Dev.	Winter Return	Winter Std. Dev.
S&P 500	5.16	0.0108	7.38	0.0116
NYSE	5.74	0.0078	12.80	0.0090
NASDAQ	8.53	0.0104	16.75	0.0115
AMEX	4.87	0.0079	12.09	0.0089
Sweden	5.48	0.0108	29.59	0.0139
Britain	0.61	0.0094	19.43	0.0108
Germany	1.55	0.0102	11.76	0.0118
Canada	0.76	0.0078	11.66	0.0092
New Zealand	8.40	0.0105	-1.44	0.0089
Japan	5.67	0.0110	14.10	0.0114
Australia	4.96	0.0114	12.68	0.0085
South Africa	20.70	0.0146	8.99	0.0122

Note: Summer returns are defined as the average annualized percentage returns from spring equinox through autumn equinox. Winter returns are defined as the average annualized returns from autumn equinox through spring equinox. All returns are calculated using the entire dataset available for each country.

Panel B: Gains to Trading Strategies Across Hemispheres (stated in annual percentage returns)

Countries	Total Returns					Excess Returns	
Northern Index / Southern Index	Neutral Strategy	Pro-SAD Port. Alloc. Strategy	Counter-SAD Port. Alloc. Strategy	Pro-SAD Shorting Strategy	Counter-SAD Shorting Strategy	Pro-SAD Port. Alloc. Strategy	Counter-SAD Port. Alloc. Strategy
S&P/Austr.	7.5	10.0	5.1	5.0	-5.0	2.5	-2.5
NYSE/Austr.	9.0	12.7	5.4	7.4	-7.4	3.7	-3.7
NASDAQ/Austr.	10.7	14.7	6.7	8.0	-8.0	4.0	-4.0
AMEX/Austr.	8.7	12.4	4.9	7.5	-7.5	3.7	-3.7
Sweden/Austr.	13.2	21.1	5.2	15.9	-15.9	8.0	-8.0
Britain/Austr.	9.4	16.1	2.8	13.3	-13.3	6.6	-6.6
Germany/Austr.	7.7	12.2	3.3	9.0	-9.0	4.5	-4.5
Canada/Austr.	7.5	12.2	2.9	5.3	-9.3	4.7	-4.7
S&P/S. Africa	10.6	8.2	12.9	-4.7	4.7	-2.4	2.4
NYSE/S. Africa	12.1	10.9	13.2	-2.3	2.3	-1.2	1.2
NASDAQ/S. Africa	13.7	12.9	14.6	-1.7	1.7	-0.9	0.9
AMEX/S. Africa	11.7	10.5	12.8	-2.2	2.2	-1.1	1.1
Sweden/S. Africa	16.2	19.3	13.1	6.2	-6.2	3.1	-3.1
Britain/S. Africa	12.4	14.2	10.7	3.6	-3.6	1.8	-1.8
Germany/S. Africa	10.7	10.4	11.1	-0.7	0.7	-0.4	0.4
Canada/S. Africa	10.5	10.3	10.7	-0.4	0.4	-0.2	0.2
S&P/NZ	4.9	3.0	6.8	-3.8	3.8	-1.9	1.9
NYSE/NZ	6.4	5.7	7.1	-1.4	1.4	-0.7	0.7
NASDAQ/NZ	8.1	7.7	8.5	-0.8	0.8	-0.4	0.4
AMEX/NZ	6.0	5.3	6.6	-1.3	1.3	-0.7	0.7
Sweden/NZ	10.5	14.1	6.9	7.1	-7.1	3.6	-3.6
Britain/NZ	6.8	9.0	4.5	4.5	-4.5	2.2	-2.2
Germany/NZ	5.1	5.2	5.0	0.2	-0.2	0.1	-0.1
Canada/NZ	4.8	5.1	4.6	0.5	-0.5	0.3	-0.3

Notes: The neutral strategy involves placing 50% of one's portfolio in the Northern Porfolio index and 50% in the Southern Hemisphere index. The Pro-SAD Portfolio Allocation strategy involves placing 100% of one's portfolio in the northern index during the Northern Hemisphere's fall and winter and in the southern index during the Southern Hemisphere's winter. The Counter-SAD Portfolio Allocation strategy reverses the timing. Excess returns are calculated by deducting the return from the neutral strategy from the total return from the Portfolio Allocation total return. The Pro-SAD Shorting strategy involves taking a long position in the northern index during the Northern Hemisphere's fall and winter and taking a short position in the southern index during that period, then taking a long position in the southern index during the Southern Hemisphere's fall and winter and a short position in the northern index at the same time. The Counter-SAD Shorting strategy reverses the timing, resulting in total returns exactly the same in magnitude to the Pro-SAD Shorting strategy, but with opposite sign.