Netspar Network for Studies on Pensions, Aging and Retirement

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Appendix to: Causality Effects in Return Volatility Measures with Random Times

Discussion Paper 2005 - 021

January 2008 (replacing last version of November 2005)

Appendix to: Causality Effects in Return Volatility Measures with Random Times

This document contains some supplementary empirical material. In particular, we show graphically the effect of long (short) durations on short-run volatility prediction. Furthermore, we provide all the individual estimates per trading day quarter.

1 Graphical representation instantaneous causality effect

Figures 1-2 provide the relative volatility updates due to the information that the next quote change has not or has arrived before the given time indicated on the horizontal axis. Both figures are constructed using the parameter estimates for IBM as reported in the main text, under the working assumption that the function β is constant, and imposing a conditionally exponential duration distribution. Both latter assumptions are for illustrative purposes only and not maintained in the main text.

Figure 1 shows that a present time prediction made for the instantaneous volatility 1.5 seconds from now (the median duration), conditional on not having seen a quote revision by that time, is about 40% less than the unconditional prediction. Note, however, that since Figure 1 has been built under the working assumption that the function β is constant, we are likely to exaggerate volatility updates for large durations. Similarly, Figure 2 gives the volatility update, in present time predictions, conditional on having seen a quote revision within a given period. At the median duration of 1.5 seconds, the instantaneous volatility prediction now has to be increased by about 28% if we know that a new quote is available. In other words, the instantaneous causality effect is clearly economically significant. A similar effect would also show up with durations between trades as shown in a previous version of this paper. Note that the nice feature of proportional updates of volatility predictions as displayed in Figures 1 and 2 is a direct consequence of the ACD type Assumptions A and C. The relative adjustment given the hypothetical information that the next duration exceeds (or is below) its conditional median, its conditional first quartile, or any given conditional quantile, is always the same, irrespective of the other available forecasting information. This nice, albeit simple, updating rule is quite useful for economic reasoning. This is the reason why the direct specification of a duration model, while remaining nonparametric about the distribution F of rescaled durations and the causality function β, is more convenient for our purposes than a more general model about the point process of quote revisions.

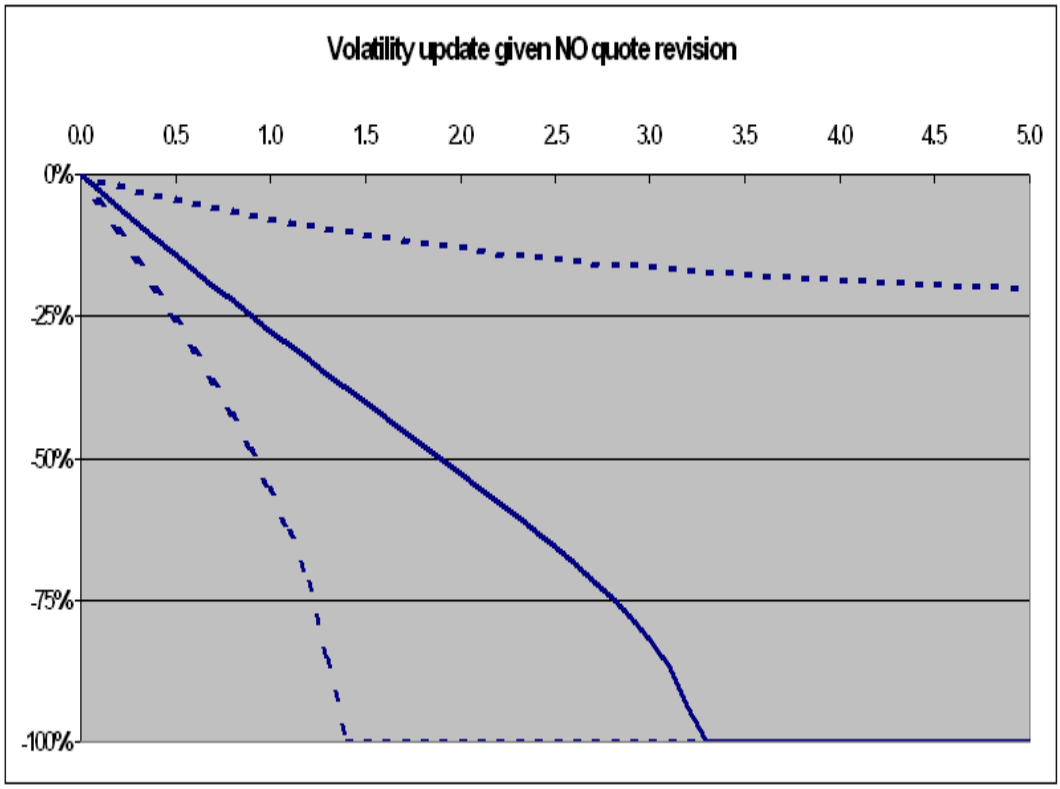

Figure 1: Relative update in instantaneous volatility prediction due to *not* having seen a new quote by the time (in seconds) indicated on the horizontal axis. The graph is based on the estimated parameters for IBM (Section 4) and the additional hypotheses of a constant regression function β and exponentially distributed durations. The solid line gives the point estimate and the dotted lines give 95% confidence intervals.

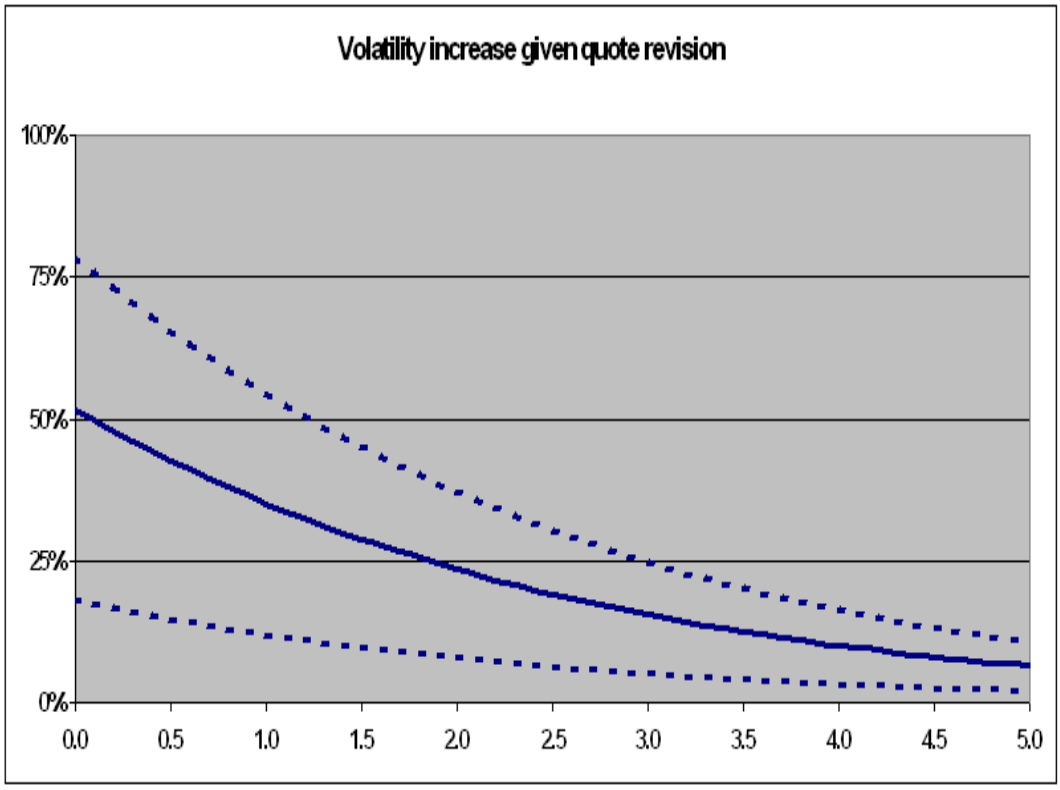

Figure 2: Relative update in instantaneous volatility prediction due to having seen a new quote by the time (in seconds) indicated on the horizontal axis. The graph is based on the estimated parameters for IBM (Section 4) and the additional hypotheses of a constant regression function β and exponentially distributed durations. The solid line gives the point estimate and the dotted lines give 95% confidence intervals.

Non-aggregated parameter estimates

The main text of the paper shows, in the empirical illustration, only average estimates for the parameters of interest. Tables 1–20 show the original estimates for each of the daily 15-minute intervals. In these tables the estimated standard errors for φ are not reported. As mentioned in the main text, this dispersion parameter is not directly of interest to us and is also not well identified by the moment conditions we use.

The main text provides average parameter estimates. For each parameter and each stock, we calculate the weighted average of the estimates obtained for each quarter. The first quarter is left out as the micro structure may be too different. The weights equal the inverse of the estimated variances of the parameters.

Parameter	9.30	9.45	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00	12.15	12.30
μ (%)	0.00	0.02	-0.00	-0.00	0.06	-0.01	0.02	0.02	-0.00	-0.00	-0.01	0.00	-0.02
	(1.02)	(0.67)	(0.52)	(0.51)	(0.43)	(0.35)	(0.37)	(0.35)	(0.29)	(0.25)	(0.25)	(0.29)	(0.24)
α_0	8.49	6.23	2.41	1.94	3.17	1.03	1.09	1.03	1.08	1.01	0.66	1.20	0.36
	(1.36)	(0.83)	(0.72)	(0.32)	(0.79)	(0.31)	(0.19)	(0.24)	(0.17)	(0.16)	(0.12)	(0.25)	(0.13)
α_1 (%)	-5.74	-56.34	-5.06	-5.00	-23.84	0.43	-4.03	-4.06	-5.91	-6.48	-1.92	-7.99	-0.16
	(29.10)	(11.87)	(13.55)	(6.68)	(8.94)	(4.26)	(2.36)	(2.05)	(1.91)	(1.62)	(1.41)	(2.41)	(1.61)
$\beta^\star$	1.62	-1.00	-1.00	-1.00	-0.99	-1.00	0.48	-0.98	-0.90	-1.00	-0.97	-0.93	3.30
	(16.87)	(2.39)	(2.21)	(1.22)	(0.85)	(22.56)	(1.86)	(0.40)	(0.54)	(0.92)	(1.23)	(1.03)	(11.03)
φ	6.12	0.00	0.64	0.65	34.42	0.74	1.11	13.17	1.29	0.84	17.50	1.92	6.79
$\sigma^2_{mms,h}$	12.23	23.46	10.09	9.96	3.88	11.81	0.00	0.00	2.37	0.00	4.74	0.00	1.58
	(48.68)	(25.55)	(13.52)	(13.46)	(29.10)	(9.72)	(5.84)	(7.84)	(3.94)	(3.23)	(4.09)	(5.50)	(3.37)
$\sigma^2_{mms,\psi}$	10.15	11.43	5.28	4.14	5.24	2.79	0.75	2.54	2.18	2.14	2.43	2.39	0.11
	(100.00)	(14.49)	(5.80)	(2.66)	(2.88)	(25.55)	(2.21)	(0.81)	(0.80)	(1.19)	(0.96)	(1.17)	(4.73)
p-value	(0.00)	(0.16)	(0.52)	(0.02)	(0.32)	(0.19)	(0.11)	(0.18)	(0.88)	(0.58)	(0.18)	(0.38)	(0.07)

Table 1: 15-minute interval estimates for stock DDS. See paper for details.

Parameter	12.45	13.00	13.15	13.30	13.45	14.00	14.15	14.30	14.15	15.00	15.15	15.30	15.45
μ (%)	0.01	0.36	0.00	-0.00	-0.00	-0.48	-0.02	0.00	0.00	-0.02	-0.01	0.03	0.01
	(0.22)	(0.23)	(0.21)	(0.20)	(0.22)	(0.21)	(0.25)	(0.24)	(0.23)	(0.27)	(0.26)	(0.29)	(0.28)
α_0	0.54	0.71	0.67	0.61	0.46	0.57	1.23	1.35	0.73	0.85	0.85	1.06	1.01
	(0.12)	(0.12)	(0.13)	(0.10)	(0.11)	(0.09)	(0.19)	(0.22)	(0.11)	(0.11)	(0.12)	(0.18)	(0.19)
α_1 (%)	-2.35	-3.90	-3.57	-3.28	-0.77	-3.65	-11.75	-13.01	-4.29	-5.81	-5.06	-8.90	-9.84
	(0.94)	(1.48)	(1.15)	(1.01)	(1.12)	(0.96)	(2.33)	(2.93)	(1.54)	(1.65)	(2.18)	(3.68)	(3.84)
$\beta^\star$	-0.95	-1.00	-0.98	1.13	-1.00	-0.98	-0.65	-0.98	-0.95	-0.92	-0.99	-0.71	-1.00
	(0.68)	(2.24)	(20.41)	(26.86)	(0.49)	(0.39)	(0.91)	(0.75)	(0.46)	(2.67)	(1.64)	(1.32)	(3.08)
φ	1.79	173.64	20.99	0.62	1.32	10.41	0.96	2.27	5.82	4.35	38.95	2.16	0.72
$\sigma^2_{mms,h}$	3.67	0.00	0.00	0.00	0.00	4.24	0.00	0.00	0.00	1.90	1.45	0.00	4.85
	(3.29)	(3.01)	(3.08)	(2.19)	(3.08)	(3.30)	(4.66)	(3.64)	(2.24)	(3.64)	(4.40)	(4.98)	(4.82)
$\sigma^2_{mms,\psi}$	1.73	1.80	2.23	0.11	1.36	1.57	2.04	1.63	1.77	1.91	1.68	1.92	1.72
	(0.68)	(1.77)	(16.35)	(21.77)	(0.33)	(0.37)	(1.40)	(1.07)	(0.48)	(2.16)	(1.23)	(1.05)	(2.24)
p-value	(0.30)	(0.60)	(0.59)	(0.11)	(0.21)	(0.38)	(0.20)	(0.26)	(0.84)	(0.23)	(0.94)	(0.43)	(0.74)

Table 2: 15-minute interval estimates for stock DDS. See paper for details.

Parameter	9.30	9.45	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00	12.15	12.30
μ (%)	-0.00	0.00	-0.01	-0.01	0.01	-0.00	0.01	0.02	-0.01	0.00	-0.00	-0.01	-0.01
	(0.73)	(0.50)	(0.37)	(0.34)	(0.32)	(0.29)	(0.30)	(0.27)	(0.23)	(0.26)	(0.26)	(0.22)	(0.23)
α_0	3.26	1.84	1.53	1.32	1.30	0.98	0.92	0.81	0.74	0.66	0.66	0.62	0.62
	(0.53)	(0.29)	(0.16)	(0.14)	(0.20)	(0.13)	(0.14)	(0.12)	(0.11)	(0.14)	(0.10)	(0.10)	(0.12)
α_1 (%)	-5.43	1.96	-5.03	-7.99	-7.02	-7.69	-5.64	-5.77	-6.36	-3.83	-3.22	-4.20	-4.40
	(5.91)	(3.35)	(2.93)	(2.16)	(2.73)	(2.40)	(1.62)	(1.34)	(1.57)	(1.81)	(1.31)	(1.43)	(1.47)
$\beta^\star$	-0.44	-0.54	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	0.85	-0.76	-1.00
	(0.31)	(10.49)	(0.94)	(0.82)	(1.30)	(1.42)	(0.27)	(0.60)	(8.87)	(0.72)	(0.78)	(0.74)	(0.85)
φ	0.27	0.10	0.93	0.84	0.80	1.03	0.59	0.76	0.43	0.76	0.84	0.08	0.02
$\sigma^2_{mms,h}$	0.00	0.00	0.00	0.78	1.81	0.00	1.78	4.69	1.77	0.00	0.00	0.00	2.19
	(19.45)	(10.83)	(7.11)	(6.07)	(5.23)	(3.94)	(5.31)	(4.13)	(2.75)	(4.01)	(3.11)	(2.35)	(2.87)
$\sigma^2_{mms,\psi}$	1.74	1.41	1.82	1.49	1.40	1.06	0.99	0.91	0.78	0.79	0.00	0.42	0.77
	(1.51)	(22.13)	(1.13)	(1.03)	(1.95)	(1.35)	(0.37)	(0.69)	(7.58)	(0.53)	(0.64)	(0.59)	(0.61)
p-value	(0.01)	(0.26)	(0.15)	(0.16)	(0.38)	(0.12)	(0.30)	(0.26)	(0.11)	(0.19)	(0.19)	(0.24)	(0.18)

Table 3: 15-minute interval estimates for stock FD. See paper for details.

Parameter	12.45	13.00	13.15	13.30	13.45	14.00	14.15	14.30	14.15	15.00	15.15	15.30	15.45
μ (%)	-0.00	-0.81	0.00	-0.01	-0.01	0.01	-0.00	-0.30	-0.00	-0.00	0.00	0.00	0.22
	(0.24)	(0.21)	(0.23)	(0.21)	(0.22)	(0.21)	(0.20)	(0.26)	(0.22)	(0.22)	(0.21)	(0.25)	(0.29)
α_0	0.52	0.54	0.72	0.97	0.49	0.41	0.38	0.47	0.49	0.46	0.55	0.53	0.48
	(0.14)	(0.07)	(0.16)	(0.21)	(0.09)	(0.06)	(0.06)	(0.12)	(0.07)	(0.06)	(0.08)	(0.08)	(0.22)
α_1 (%)	-2.16	-3.07	-6.76	-10.01	-4.51	-2.37	-0.83	-0.83	-2.64	-2.06	-3.69	-2.39	0.06
	(1.54)	(1.13)	(2.34)	(3.38)	(1.25)	(0.79)	(0.76)	(1.42)	(1.05)	(1.06)	(1.36)	(1.22)	(4.00)
$\beta^\star$	-0.75	-1.00	-0.94	-1.00	-1.00	-1.00	-0.66	-1.00	-1.00	-0.01	-1.00	-0.93	-0.91
	(0.35)	(1.68)	(0.70)	(1.98)	(0.35)	(7.58)	(0.81)	(0.15)	(1.02)	(4.76)	(0.88)	(0.24)	(3.75)
φ	0.00	600.98	1.17	1.47	1.07	0.95	0.87	164.49	1.36	0.65	1.23	0.02	303.81
$\sigma^2_{mms,h}$	1.01	0.74	0.00	0.00	2.15	2.85	0.00	0.00	1.63	3.39	0.00	0.00	0.00
	(2.74)	(2.77)	(2.04)	(4.22)	(3.37)	(2.00)	(2.02)	(3.12)	(2.29)	(2.79)	(2.42)	(2.36)	(3.90)
$\sigma^2_{mms,\psi}$	0.43	0.71	0.74	0.72	0.65	0.62	0.45	0.63	0.61	0.09	0.50	0.50	0.28
	(0.26)	(0.91)	(0.53)	(1.34)	(0.27)	(3.41)	(0.42)	(0.13)	(0.59)	(2.22)	(0.56)	(0.17)	(1.74)
p-value	(0.34)	(0.96)	(0.14)	(0.56)	(0.02)	(0.21)	(0.81)	(0.32)	(0.70)	(0.62)	(0.22)	(0.16)	(0.44)

Table 4: 15-minute interval estimates for stock FD. See paper for details.

Parameter	9.30	9.45	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00	12.15	12.30
μ (%)	0.01	0.00	0.00	0.00	-0.01	0.00	0.00	-0.00	-0.00	-0.04	-0.05	0.00	-0.00
	(0.31)	(0.23)	(0.21)	(0.24)	(0.21)	(0.18)	(0.17)	(0.17)	(0.13)	(0.13)	(0.13)	(0.13)	(0.12)
α_0	0.68	0.47	0.44	0.41	0.31	0.23	0.27	0.23	0.18	0.18	0.14	0.17	0.15
	(0.10)	(0.06)	(0.05)	(0.07)	(0.06)	(0.04)	(0.03)	(0.04)	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)
α_1 (%)	-2.00	-3.07	-3.18	-2.63	-0.77	0.24	-2.56	-1.20	-2.28	-2.04	-1.27	-1.66	-1.86
	(4.23)	(2.15)	(1.38)	(1.82)	(2.43)	(1.23)	(1.01)	(1.16)	(0.68)	(0.68)	(0.61)	(0.60)	(0.51)
$\beta^\star$	0.37	0.06	-0.51	-0.32	0.26	0.12	-0.31	-0.66	-1.00	-0.23	1.05	-1.00	-1.00
	(3.03)	(14.56)	(0.98)	(1.79)	(2.03)	(11.23)	(1.44)	(0.72)	(1.70)	(2.00)	(4.64)	(1.33)	(1.18)
φ	0.45	0.00	0.00	0.00	0.00	5.40	0.28	1.34	4.28	0.20	0.66	0.49	0.78
$\sigma^2_{mms,h}$	3.16	1.36	0.58	0.00	1.48	0.64	1.16	1.18	1.56	1.40	1.41	0.64	0.92
	(1.70)	(0.95)	(0.88)	(1.02)	(0.76)	(0.62)	(0.55)	(0.52)	(0.39)	(0.36)	(0.41)	(0.37)	(0.32)
$\sigma^2_{mms,\psi}$	0.07	0.00	0.25	0.10	0.00	0.00	0.13	0.24	0.25	0.11	0.00	0.21	0.20
	(1.37)	(4.52)	(0.33)	(0.47)	(0.41)	(1.62)	(0.26)	(0.11)	(0.22)	(0.21)	(0.45)	(0.16)	(0.13)
p-value	(0.11)	(0.53)	(0.66)	(0.75)	(0.74)	(1.00)	(1.00)	(0.98)	(0.73)	(0.09)	(0.31)	(0.44)	(0.96)

Table 5: 15-minute interval estimates for stock IBM. See paper for details.

Parameter	12.45	13.00	13.15	13.30	13.45	14.00	14.15	14.30	14.15	15.00	15.15	15.30	15.45
μ (%)	0.00	-0.00	-0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	-0.00	0.00	-0.02
	(0.12)	(0.12)	(0.15)	(0.12)	(0.14)	(0.15)	(0.15)	(0.15)	(0.15)	(0.15)	(0.17)	(0.19)	(0.25)
α_0	0.13	0.17	0.18	0.13	0.15	0.27	0.20	0.21	0.21	0.21	0.24	0.26	0.36
	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.05)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.07)
α_1 (%)	-1.12	-1.95	-1.05	-1.07	-0.36	-3.74	-1.49	-1.95	-1.58	-1.79	-0.84	0.15	-0.41
	(0.47)	(0.56)	(0.79)	(0.43)	(0.80)	(1.40)	(0.78)	(0.88)	(0.93)	(1.08)	(1.23)	(1.61)	(3.00)
$\beta^\star$	-1.00	-0.72	-0.78	-0.94	-1.00	-1.00	-0.98	-0.63	-0.57	-1.00	-0.46	-0.26	0.06
	(2.11)	(1.34)	(6.35)	(1.49)	(20.68)	(3.73)	(0.57)	(1.37)	(0.35)	(4.16)	(1.43)	(38.06)	(1.28)
φ	1.34	1.52	0.89	0.72	3.82	4.59	8.46	1.42	0.34	3.62	0.03	0.03	0.00
$\sigma^2_{mms,h}$	0.53	0.56	0.38	1.14	1.32	1.85	1.44	1.07	1.38	1.75	0.48	0.00	0.00
	(0.33)	(0.29)	(0.48)	(0.33)	(0.44)	(0.72)	(0.48)	(0.49)	(0.44)	(0.51)	(0.53)	(0.62)	(0.92)
$\sigma^2_{mms,\psi}$	0.17	0.19	0.20	0.21	0.24	0.27	0.26	0.22	0.16	0.26	0.12	0.06	0.00
	(0.20)	(0.17)	(0.79)	(0.14)	(1.99)	(0.68)	(0.08)	(0.19)	(0.06)	(0.50)	(0.21)	(6.13)	(0.28)
p-value	(0.70)	(0.30)	(0.70)	(0.92)	(0.96)	(0.94)	(0.89)	(0.67)	(0.60)	(0.83)	(0.94)	(0.96)	(0.02)

Table 6: 15-minute interval estimates for stock IBM. See paper for details.

Parameter	9.30	9.45	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00	12.15	12.30
μ (%)	0.02	-0.00	-0.03	-0.01	-0.00	0.01	0.00	0.07	0.00	0.00	-0.01	0.00	-0.00
	(0.65)	(0.51)	(0.38)	(0.36)	(0.29)	(0.30)	(0.25)	(0.26)	(0.20)	(0.23)	(0.24)	(0.25)	(0.20)
α_0	2.48	1.79	1.20	1.03	1.01	0.89	0.65	0.55	0.55	0.34	0.52	0.85	0.47
	(0.35)	(0.40)	(0.16)	(0.13)	(0.14)	(0.17)	(0.14)	(0.10)	(0.09)	(0.06)	(0.10)	(0.36)	(0.07)
α_1 (%)	15.97	-7.51	-1.27	-2.66	-9.33	-4.06	-3.01	1.04	-4.35	0.35	-2.60	-8.21	-3.07
	(7.46)	(7.07)	(5.64)	(2.75)	(2.54)	(3.34)	(3.13)	(1.82)	(1.54)	(1.33)	(1.62)	(5.22)	(1.32)
$\beta^\star$	-0.97	-0.45	-0.16	-0.69	-1.00	-0.77	-0.95	-0.93	-0.93	-1.00	-1.00	-0.98	-0.94
	(0.95)	(2.17)	(5.63)	(0.33)	(2.53)	(0.57)	(7.94)	(1.77)	(1.28)	(2.51)	(5.83)	(0.71)	(0.26)
φ	18.75	0.18	0.41	0.26	0.73	1.62	0.00	49.94	0.98	13.94	0.73	4.46	1.23
$\sigma^2_{mms,h}$	7.75	0.00	0.00	2.90	2.95	0.15	0.08	0.00	0.82	0.00	0.00	0.00	0.00
	(13.22)	(9.39)	(6.37)	(4.58)	(3.88)	(4.40)	(2.50)	(3.14)	(2.06)	(1.74)	(1.89)	(3.77)	(1.71)
$\sigma^2_{mms,\psi}$	3.31	1.10	0.20	0.83	1.16	0.95	0.82	0.32	0.73	0.74	0.72	0.91	0.72
	(2.49)	(4.26)	(3.92)	(0.50)	(2.14)	(0.56)	(4.88)	(0.84)	(0.74)	(0.89)	(2.94)	(0.73)	(0.22)
p-value	(0.31)	(0.36)	(0.51)	(0.53)	(0.31)	(0.21)	(0.70)	(0.38)	(0.97)	(0.45)	(0.35)	(0.28)	(0.09)

Table 7: 15-minute interval estimates for stock JCP. See paper for details.

Parameter	12.45	13.00	13.15	13.30	13.45	14.00	14.15	14.30	14.15	15.00	15.15	15.30	15.45
μ (%)	-0.00	0.00	-0.00	-0.00	-0.00	0.00	0.00	0.00	-0.00	0.01	0.00	-0.00	-0.02
	(0.19)	(0.22)	(0.20)	(0.18)	(0.21)	(0.22)	(0.22)	(0.20)	(0.23)	(0.21)	(0.24)	(0.21)	(0.29)
α_0	0.31	0.53	0.50	0.44	0.57	0.62	0.69	0.54	0.63	0.40	0.39	0.49	0.48
	(0.08)	(0.10)	(0.13)	(0.07)	(0.10)	(0.11)	(0.16)	(0.07)	(0.10)	(0.06)	(0.08)	(0.07)	(0.08)
α_1 (%)	-0.13	-3.94	-4.61	-2.90	-4.69	-5.16	-7.86	-4.76	-5.94	-0.03	0.97	-3.56	0.02
	(1.31)	(1.43)	(2.26)	(1.22)	(1.43)	(1.71)	(3.15)	(1.39)	(1.97)	(1.52)	(2.29)	(1.73)	(1.55)
$\beta^\star$	0.85	-1.00	-1.00	-0.94	-1.00	-0.96	-0.81	-0.79	-1.00	-0.82	-0.26	-0.62	0.05
	(3.69)	(0.32)	(2.01)	(5.95)	(1.25)	(0.25)	(0.68)	(2.19)	(0.83)	(0.67)	(1.73)	(0.88)	(0.93)
φ	8.80	0.33	1.03	1.12	0.40	4.32	0.98	0.05	0.54	20.90	0.86	0.82	2.94
$\sigma^2_{mms,h}$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73	0.53	0.00	0.00	0.00
	(1.89)	(1.88)	(1.97)	(1.46)	(2.11)	(2.49)	(2.01)	(1.58)	(2.19)	(1.84)	(2.09)	(1.85)	(2.12)
$\sigma^2_{mms,\psi}$	0.07	0.66	0.56	0.60	0.66	0.83	0.63	0.43	0.66	0.61	0.12	0.38	0.00
	(1.23)	(0.22)	(0.87)	(2.63)	(0.75)	(0.19)	(0.36)	(1.06)	(0.50)	(0.35)	(0.55)	(0.38)	(0.44)
p-value	(0.58)	(0.33)	(0.12)	(0.39)	(0.06)	(0.98)	(0.72)	(0.89)	(0.13)	(0.44)	(0.95)	(0.05)	(0.12)

Table 8: 15-minute interval estimates for stock JCP. See paper for details.

Parameter	9.30	9.45	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00	12.15	12.30
μ (%)	0.14	-0.00	0.00	0.01	-0.00	-0.00	-0.00	-0.00	-0.00	0.00	0.00	-0.00	0.00
	(0.80)	(0.57)	(0.38)	(0.35)	(0.29)	(0.34)	(0.31)	(0.31)	(0.24)	(0.23)	(0.21)	(0.22)	(0.21)
α_0	7.64	2.93	2.22	1.04	1.04	1.14	1.29	1.46	0.68	0.53	0.39	0.46	0.50
	(1.10)	(0.91)	(0.33)	(0.16)	(0.19)	(0.20)	(0.26)	(0.37)	(0.25)	(0.10)	(0.09)	(0.07)	(0.09)
α_1 (%)	-41.96	-5.07	-18.37	-2.78	-5.26	-7.54	-11.44	-14.54	-3.93	-2.97	-0.75	-2.20	-3.80
	(15.26)	(17.36)	(6.05)	(2.83)	(3.39)	(3.06)	(4.83)	(5.92)	(4.01)	(1.52)	(1.57)	(0.78)	(1.55)
$\beta^\star$	-0.54	-1.00	-0.73	-1.00	-0.65	-1.00	-0.99	-1.00	-1.00	-0.83	-0.36	-0.88	-0.93
	(4.08)	(0.44)	(1.17)	(1.55)	(6.42)	(64.98)	(1.20)	(0.85)	(0.93)	(0.61)	(1.25)	(1.01)	(2.36)
φ	0.00	0.63	0.61	0.69	1.08	0.69	21.63	38.03	0.67	2.27	4.40	3.05	6.21
$\sigma^2_{mms,h}$	50.15	10.03	9.86	12.68	4.92	0.00	1.94	0.00	1.26	3.76	5.70	2.24	1.74
	(30.54)	(16.74)	(9.16)	(6.01)	(4.03)	(4.27)	(3.83)	(5.76)	(3.73)	(2.38)	(2.66)	(1.95)	(2.06)
$\sigma^2_{mms,\psi}$	9.33	5.06	2.94	2.20	1.54	1.45	1.61	2.04	1.42	1.34	1.27	1.23	1.38
	(40.06)	(1.54)	(2.63)	(1.36)	(5.76)	(62.60)	(1.50)	(1.22)	(0.67)	(0.40)	(0.54)	(0.48)	(1.44)
p-value	(0.12)	(0.37)	(0.59)	(0.27)	(0.31)	(0.24)	(0.53)	(0.73)	(0.36)	(0.84)	(0.64)	(0.71)	(0.03)

Table 9: 15-minute interval estimates for stock MAT. See paper for details.

Parameter	12.45	13.00	13.15	13.30	13.45	14.00	14.15	14.30	14.15	15.00	15.15	15.30	15.45
μ (%)	-0.00	0.00	-0.00	-0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.00	0.00	-0.01
	(0.17)	(0.19)	(0.20)	(0.20)	(0.22)	(0.23)	(0.19)	(0.20)	(0.21)	(0.21)	(0.27)	(0.25)	(0.25)
α_0	0.25	0.27	0.39	0.51	0.46	0.55	0.40	0.72	0.67	0.46	0.60	0.80	0.75
	(0.05)	(0.07)	(0.08)	(0.08)	(0.08)	(0.07)	(0.09)	(0.15)	(0.10)	(0.09)	(0.08)	(0.10)	(0.12)
α_1 (%)	-1.03	-0.40	-1.71	-4.32	-1.60	-2.49	-3.66	-7.93	-8.34	-3.14	-0.78	-6.72	-4.43
	(0.88)	(1.15)	(1.22)	(1.24)	(1.30)	(1.46)	(1.91)	(2.33)	(2.36)	(1.59)	(2.06)	(2.18)	(3.07)
$\beta^\star$	3.04	0.48	-0.86	1.23	0.32	0.68	-0.19	0.32	-0.95	-1.00	-1.00	-0.96	-0.86
	(5.77)	(2.00)	(0.79)	(3.31)	(2.02)	(2.13)	(4.23)	(2.87)	(0.71)	(1.31)	(1.10)	(0.33)	(51.90)
φ	1.12	5.72	3.36	0.65	2.19	1.14	1.16	0.57	4.11	0.01	1.50	0.08	1.77
$\sigma^2_{mms,h}$	4.18	0.84	3.24	4.90	1.32	2.93	7.84	5.52	6.91	4.55	1.52	1.35	5.05
	(1.43)	(1.68)	(2.18)	(2.69)	(1.64)	(1.98)	(1.80)	(2.83)	(3.49)	(2.35)	(2.75)	(2.68)	(2.99)
$\sigma^2_{mms,\psi}$	0.12	0.90	1.19	0.30	0.84	0.35	1.17	0.44	1.38	1.12	1.09	1.08	1.58
	(1.47)	(0.57)	(0.39)	(1.65)	(0.86)	(1.12)	(1.52)	(1.83)	(0.64)	(0.56)	(0.59)	(0.31)	(26.20)
p-value	(0.08)	(0.13)	(0.76)	(0.11)	(0.69)	(0.71)	(0.45)	(0.72)	(0.10)	(0.37)	(0.04)	(0.12)	(0.00)

Table 10: 15-minute interval estimates for stock MAT. See paper for details.

Parameter	9.30	9.45	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00	12.15	12.30
μ (%)	-0.00	-0.00	0.00	0.00	0.00	0.00	0.00	0.01	-0.00	0.01	-0.01	0.00	0.00
	(0.71)	(0.60)	(0.47)	(0.41)	(0.32)	(0.38)	(0.29)	(0.24)	(0.23)	(0.27)	(0.26)	(0.24)	(0.21)
α_0	4.21	2.75	1.82	2.16	1.28	1.23	1.21	1.14	1.26	1.13	0.99	1.19	0.75
	(0.84)	(0.64)	(0.36)	(0.31)	(0.18)	(0.36)	(0.20)	(0.16)	(0.24)	(0.18)	(0.14)	(0.23)	(0.23)
α_1 (%)	-4.94	-5.09	-5.01	-17.52	-11.68	-9.31	-12.22	-12.47	-15.27	-12.39	-9.71	-12.46	-7.73
	(27.03)	(14.19)	(9.24)	(6.86)	(3.38)	(5.34)	(3.14)	(1.82)	(3.93)	(3.16)	(2.08)	(3.08)	(3.66)
$\beta^\star$	0.17	0.32	-0.48	-1.00	-1.00	-1.00	-1.00	-0.06	-1.00	-0.80	-1.00	-0.94	-0.36
	(25.86)	(5.51)	(4.99)	(1.44)	(0.52)	(8.85)	(0.74)	(0.56)	(0.39)	(2.30)	(1.73)	(1.07)	(2.00)
φ	0.48	0.59	0.60	0.65	0.18	0.70	0.66	0.57	123.15	0.74	33.17	0.65	0.53
$\sigma^2_{mms,h}$	10.05	9.98	10.02	0.00	8.21	0.00	3.46	0.00	2.24	0.00	0.00	6.93	1.77
	(20.11)	(13.70)	(8.77)	(6.30)	(4.96)	(10.11)	(3.64)	(3.30)	(2.59)	(2.36)	(2.31)	(4.69)	(1.90)
$\sigma^2_{mms,\psi}$	5.37	0.04	2.06	2.16	1.84	1.55	1.50	0.85	2.00	1.22	1.83	1.63	0.82
	(91.00)	(11.04)	(6.97)	(2.31)	(0.68)	(7.80)	(0.83)	(0.66)	(0.61)	(2.34)	(1.79)	(1.61)	(1.47)
p-value	(0.03)	(0.17)	(0.88)	(0.44)	(0.84)	(0.42)	(0.97)	(0.91)	(0.58)	(0.74)	(0.75)	(0.71)	(0.59)

Table 11: 15-minute interval estimates for stock MAY. See paper for details.

Parameter	12.45	13.00	13.15	13.30	13.45	14.00	14.15	14.30	14.15	15.00	15.15	15.30	15.45
μ (%)	-0.01	-0.01	-0.00	-0.01	-0.02	0.00	-0.00	-0.01	0.00	0.00	-0.00	0.02	0.03
	(0.23)	(0.21)	(0.23)	(0.22)	(0.23)	(0.20)	(0.21)	(0.22)	(0.23)	(0.22)	(0.23)	(0.25)	(0.30)
α_0	1.03	0.77	0.53	0.83	0.74	0.57	0.92	0.83	0.72	0.47	0.59	0.74	0.48
	(0.26)	(0.12)	(0.13)	(0.14)	(0.15)	(0.11)	(0.14)	(0.16)	(0.14)	(0.05)	(0.14)	(0.11)	(0.10)
α_1 (%)	-10.64	-9.27	-3.97	-8.81	-8.06	-5.54	-11.30	-9.72	-7.44	-3.54	-5.13	-8.15	2.11
	(3.43)	(2.29)	(1.87)	(2.55)	(2.14)	(1.88)	(2.42)	(2.84)	(2.83)	(1.18)	(2.57)	(2.71)	(3.48)
$\beta^\star$	-0.74	-0.87	-0.96	-0.99	-0.99	-0.07	-0.62	-0.78	-0.90	-0.83	-1.00	-0.88	-0.62
	(0.31)	(1.31)	(0.32)	(0.46)	(0.23)	(1.80)	(2.10)	(0.77)	(1.58)	(11.78)	(0.91)	(0.98)	(1.97)
φ	0.50	1.41	2.97	6.90	6.40	0.56	1.12	1.06	0.12	0.73	0.09	1.96	3.77
$\sigma^2_{mms,h}$	0.00	1.14	0.00	1.63	0.36	3.91	0.18	0.00	3.15	3.81	0.36	2.66	0.00
	(2.83)	(1.65)	(2.06)	(2.83)	(2.17)	(2.36)	(2.35)	(2.42)	(2.65)	(1.63)	(2.36)	(3.44)	(3.17)
$\sigma^2_{mms,\psi}$	1.05	1.25	1.06	1.27	1.16	0.60	1.30	1.04	0.92	0.93	1.09	1.13	0.57
	(0.40)	(0.90)	(0.31)	(0.43)	(0.27)	(0.89)	(1.54)	(0.54)	(0.98)	(4.27)	(0.63)	(0.67)	(0.78)
p-value	(0.66)	(0.02)	(0.09)	(0.49)	(0.20)	(0.14)	(0.39)	(0.70)	(0.71)	(0.82)	(0.30)	(0.28)	(0.22)

Table 12: 15-minute interval estimates for stock MAY. See paper for details.

Parameter	9.30	9.45	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00	12.15	12.30
μ (%)	0.00	0.01	-0.00	-0.00	-0.00	0.01	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.00
	(0.61)	(0.40)	(0.35)	(0.29)	(0.29)	(0.27)	(0.25)	(0.24)	(0.23)	(0.22)	(0.21)	(0.21)	(0.17)
α_0	2.54	1.63	1.00	0.74	0.78	0.56	0.65	0.48	0.51	0.50	0.40	0.49	0.34
	(0.34)	(0.24)	(0.16)	(0.09)	(0.15)	(0.09)	(0.09)	(0.06)	(0.08)	(0.08)	(0.07)	(0.06)	(0.05)
α_1 (%)	-4.95	-16.61	-3.36	-4.28	-4.44	-2.58	-7.33	-3.59	-5.14	-4.80	-3.37	-5.15	-3.94
	(7.58)	(8.75)	(5.78)	(2.58)	(4.40)	(2.88)	(2.48)	(1.65)	(2.55)	(2.01)	(1.58)	(1.43)	(1.28)
$\beta^\star$	-0.02	1.64	-0.31	-0.71	-0.97	-1.00	0.14	0.11	-0.90	-0.98	-0.72	-0.57	-0.44
	(0.64)	(13.04)	(1.24)	(19.04)	(0.62)	(390.37)	(2.07)	(3.02)	(5.35)	(0.68)	(0.67)	(1.00)	(1.15)
φ	0.00	7.00	0.09	0.00	1.09	1.33	0.66	1.35	0.55	25.52	1.62	1.68	1.37
$\sigma^2_{mms,h}$	9.94	0.00	4.28	1.14	0.00	0.00	2.08	0.00	1.40	0.45	1.05	0.66	1.26
	(7.54)	(3.08)	(2.55)	(1.73)	(1.49)	(1.24)	(1.45)	(1.18)	(1.18)	(1.04)	(1.05)	(1.11)	(0.68)
$\sigma^2_{mms,\psi}$	0.60	20.20	0.50	0.67	0.89	0.67	0.12	0.27	0.66	0.78	0.57	0.62	0.52
	(1.50)	(49.51)	(0.96)	(10.57)	(0.39)	(135.09)	(0.94)	(0.99)	(1.86)	(0.24)	(0.25)	(0.34)	(0.29)
p-value	(0.07)	(0.15)	(0.98)	(0.60)	(0.97)	(0.54)	(0.55)	(0.70)	(0.96)	(0.90)	(0.38)	(0.71)	(0.44)

Table 13: 15-minute interval estimates for stock MCD. See paper for details.

Parameter	12.45	13.00	13.15	13.30	13.45	14.00	14.15	14.30	14.15	15.00	15.15	15.30	15.45
μ (%)	0.00	-0.00	0.00	0.00	0.00	0.01	-0.01	-0.00	-0.00	-0.00	-0.00	-0.00	-0.01
	(0.17)	(0.19)	(0.18)	(0.19)	(0.19)	(0.20)	(0.19)	(0.19)	(0.18)	(0.18)	(0.21)	(0.21)	(0.25)
α_0	0.29	0.44	0.43	0.39	0.34	0.43	0.56	0.28	0.42	0.33	0.44	0.38	0.22
	(0.04)	(0.07)	(0.07)	(0.07)	(0.04)	(0.06)	(0.08)	(0.05)	(0.06)	(0.04)	(0.06)	(0.04)	(0.07)
α_1 (%)	-2.85	-5.17	-5.96	-4.90	-2.70	-4.00	-9.17	-0.91	-5.33	-3.12	-4.33	0.22	9.91
	(0.97)	(1.56)	(1.71)	(1.67)	(1.09)	(1.41)	(2.18)	(1.41)	(2.13)	(1.06)	(1.97)	(0.56)	(3.25)
$\beta^\star$	-0.05	-0.27	0.21	0.24	0.09	-0.93	0.14	-1.00	-1.00	0.18	0.35	-0.56	-0.25
	(1.79)	(1.01)	(4.36)	(2.99)	(1.39)	(2.77)	(1.19)	(1.21)	(3.02)	(1.00)	(1.34)	(0.36)	(2.81)
φ	1.34	1.03	0.87	0.95	1.42	9.91	0.61	1.19	0.53	1.40	1.42	0.12	0.58
$\sigma^2_{mms,h}$	1.27	0.35	1.23	0.01	1.01	0.80	0.82	1.67	1.56	2.14	0.15	0.00	0.00
	(0.73)	(0.81)	(0.73)	(0.68)	(0.81)	(0.91)	(0.89)	(0.77)	(0.89)	(0.77)	(0.93)	(0.87)	(1.13)
$\sigma^2_{mms,\psi}$	0.44	0.43	0.33	0.27	0.36	0.69	0.16	0.49	0.50	0.26	0.23	0.29	0.29
	(0.39)	(0.29)	(1.36)	(0.76)	(0.35)	(0.83)	(0.46)	(0.19)	(0.88)	(0.24)	(0.35)	(0.13)	(0.51)
p-value	(0.90)	(0.70)	(0.63)	(0.69)	(0.56)	(0.19)	(0.54)	(0.29)	(0.33)	(0.96)	(0.81)	(0.98)	(0.88)

Table 14: 15-minute interval estimates for stock MCD. See paper for details.

Parameter	9.30	9.45	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00	12.15	12.30
μ (%)	0.00	0.06	0.02	0.05	0.01	-0.01	0.02	-0.58	0.02	-0.07	-0.01	-0.01	0.03
	(1.06)	(0.62)	(0.51)	(0.44)	(0.33)	(0.37)	(0.31)	(0.27)	(0.28)	(0.24)	(0.23)	(0.21)	(0.22)
α_0	10.21	5.13	3.59	4.65	1.67	1.65	1.31	1.10	0.96	1.54	1.00	0.58	0.29
	(2.56)	(0.78)	(0.61)	(1.31)	(0.26)	(0.36)	(0.34)	(0.19)	(0.15)	(0.30)	(0.18)	(0.10)	(0.12)
α_1 (%)	-4.10	-28.82	-23.08	-38.65	-9.36	-9.76	-7.47	-6.18	-3.77	-10.61	-6.44	-2.70	0.21
	(27.79)	(10.91)	(7.00)	(14.50)	(2.69)	(3.17)	(3.24)	(1.79)	(1.45)	(2.81)	(1.57)	(0.99)	(0.94)
$\beta^\star$	0.94	-0.92	0.41	-1.00	-1.00	-0.99	-0.95	-0.97	0.43	-0.99	-0.92	3.57	-1.00
	(1.34)	(1.38)	(1.01)	(0.33)	(0.57)	(0.76)	(1.07)	(2.76)	(1.75)	(0.42)	(8.15)	(34.90)	(7.84)
φ	6.54	3.07	0.61	47.04	151.61	32.95	1.84	9.40	0.65	14.33	3.62	0.75	1.88
$\sigma^2_{mms,h}$	10.11	20.57	9.01	9.24	24.27	0.00	12.73	0.00	3.05	0.00	0.00	5.04	6.39
	(95.94)	(29.84)	(16.43)	(20.13)	(8.59)	(11.37)	(12.85)	(6.22)	(6.97)	(8.49)	(5.64)	(3.51)	(3.46)
$\sigma^2_{mms,\psi}$	5.80	12.65	1.26	7.02	5.05	4.58	4.45	4.46	1.60	4.31	3.91	0.00	2.60
	(16.16)	(7.15)	(4.33)	(2.06)	(1.40)	(1.81)	(2.34)	(4.38)	(2.76)	(1.26)	(11.69)	(25.08)	(3.88)
p-value	(0.22)	(0.03)	(0.19)	(0.08)	(0.96)	(0.62)	(0.37)	(0.09)	(0.39)	(0.11)	(0.05)	(0.30)	(0.12)

Table 15: 15-minute interval estimates for stock SKS. See paper for details.

Parameter	12.45	13.00	13.15	13.30	13.45	14.00	14.15	14.30	14.15	15.00	15.15	15.30	15.45
μ (%)	-0.00	-0.01	-0.00	-0.01	-0.56	0.01	0.01	0.01	0.44	-0.00	0.00	0.01	-0.02
	(0.22)	(0.24)	(0.18)	(0.23)	(0.21)	(0.26)	(0.23)	(0.24)	(0.19)	(0.22)	(0.23)	(0.27)	(0.32)
α_0	0.47	0.77	0.65	0.73	0.59	0.68	0.84	0.74	0.98	0.60	0.91	0.65	1.28
	(0.11)	(0.21)	(0.10)	(0.16)	(0.11)	(0.15)	(0.15)	(0.14)	(0.21)	(0.13)	(0.15)	(0.17)	(0.23)
α_1 (%)	-1.21	-4.39	-3.23	-4.28	-2.52	-3.05	-5.17	-4.75	-8.88	-3.63	-8.76	-2.74	-13.26
	(0.85)	(1.59)	(0.87)	(1.26)	(0.86)	(1.95)	(1.78)	(1.32)	(2.26)	(1.77)	(2.36)	(3.13)	(5.23)
$\beta^\star$	3.11	-0.89	-0.98	-1.00	-0.78	-0.43	-1.00	-0.96	-0.99	-0.96	-0.99	-0.99	1.40
	(13.98)	(1.76)	(1.11)	(2.91)	(2.47)	(27.39)	(1.04)	(0.64)	(0.57)	(3.84)	(4.31)	(0.98)	(4.02)
φ	0.96	1.29	3.19	0.81	1.61	1.23	0.00	11.05	22.92	18.93	15.94	93.81	0.68
$\sigma^2_{mms,h}$	3.45	0.00	2.37	5.66	0.00	0.33	0.00	0.00	7.83	3.76	1.69	0.00	3.63
	(4.60)	(5.14)	(3.14)	(4.91)	(3.71)	(4.45)	(3.54)	(6.15)	(5.21)	(3.80)	(3.38)	(5.19)	(6.40)
$\sigma^2_{mms,\psi}$	0.23	2.40	2.38	2.29	2.16	2.10	2.08	2.51	2.85	2.50	2.17	2.51	0.12
	(10.56)	(1.87)	(1.32)	(2.94)	(2.13)	(24.35)	(1.23)	(0.91)	(0.90)	(2.54)	(4.58)	(0.77)	(3.35)
p-value	(0.49)	(0.66)	(0.18)	(0.59)	(0.48)	(0.23)	(0.56)	(0.07)	(0.46)	(0.40)	(0.33)	(0.58)	(0.84)

Table 16: 15-minute interval estimates for stock SKS. See paper for details.

Parameter	9.30	9.45	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00	12.15	12.30
μ (%)	0.01	0.00	-0.00	0.00	0.00	0.00	0.01	0.00	0.00	-0.00	-0.00	0.00	0.00
	(0.66)	(0.41)	(0.40)	(0.43)	(0.47)	(0.36)	(0.35)	(0.32)	(0.30)	(0.28)	(0.29)	(0.29)	(0.27)
α_0	2.71	1.42	0.88	1.28	1.41	0.96	0.84	0.80	0.77	0.64	0.61	0.66	0.57
	(0.36)	(0.15)	(0.11)	(0.16)	(0.17)	(0.14)	(0.10)	(0.10)	(0.10)	(0.08)	(0.09)	(0.09)	(0.09)
α_1 (%)	-2.18	-5.60	5.31	4.14	4.86	-0.43	1.19	-1.30	-2.37	-4.01	-1.75	-2.20	-2.55
	(4.57)	(1.22)	(2.33)	(2.82)	(3.30)	(2.94)	(2.45)	(2.55)	(2.10)	(2.19)	(2.20)	(1.78)	(1.73)
$\beta^\star$	-0.36	0.36	-0.78	-0.59	-0.54	-0.19	-0.88	-0.37	-0.34	-1.00	-0.36	-0.54	-0.40
	(6.45)	(7.78)	(0.57)	(3.84)	(27.05)	(3.65)	(1.24)	(0.96)	(3.57)	(0.63)	(8.92)	(0.67)	(1.24)
φ	0.00	0.74	1.48	1.05	0.82	0.00	14.74	0.00	0.64	0.77	0.00	0.00	0.00
$\sigma^2_{mms,h}$	0.00	8.76	0.00	0.00	6.88	9.21	1.79	0.00	0.82	2.34	0.00	0.00	0.00
	(8.66)	(3.86)	(2.94)	(5.05)	(5.41)	(3.94)	(2.91)	(2.24)	(2.24)	(1.73)	(1.83)	(1.64)	(1.74)
$\sigma^2_{mms,\psi}$	0.00	0.00	0.59	0.22	0.19	0.00	0.41	0.00	0.08	0.62	0.00	0.10	0.00
	(17.22)	(9.35)	(0.40)	(4.80)	(33.45)	(3.00)	(0.78)	(0.69)	(2.27)	(0.31)	(4.86)	(0.39)	(0.52)
p-value	(0.01)	(0.08)	(0.49)	(0.11)	(0.68)	(0.55)	(0.40)	(0.68)	(0.67)	(0.33)	(0.64)	(0.29)	(0.40)

Table 17: 15-minute interval estimates for stock SLB. See paper for details.

Parameter	12.45	13.00	13.15	13.30	13.45	14.00	14.15	14.30	14.15	15.00	15.15	15.30	15.45
μ (%)	-0.00	-0.00	0.00	-0.00	0.00	-0.01	0.00	-0.00	0.01	-0.00	-0.00	-0.01	-0.01
	(0.24)	(0.25)	(0.29)	(0.27)	(0.28)	(0.27)	(0.31)	(0.29)	(0.25)	(0.26)	(0.25)	(0.24)	(0.25)
α_0	0.45	0.50	0.62	0.58	0.61	0.87	0.73	0.73	0.52	0.59	0.47	0.29	0.35
	(0.07)	(0.07)	(0.08)	(0.09)	(0.08)	(0.12)	(0.13)	(0.09)	(0.06)	(0.07)	(0.08)	(0.05)	(0.05)
α_1 (%)	0.82	-2.08	-3.85	-3.37	-2.21	-10.27	-4.67	-5.07	-1.85	-5.19	0.29	2.82	0.78
	(1.76)	(2.34)	(1.80)	(1.96)	(2.01)	(2.76)	(3.16)	(2.17)	(1.72)	(1.89)	(2.01)	(1.35)	(1.17)
$\beta^\star$	-0.47	-0.48	-1.00	-0.46	-1.00	-1.00	-0.44	-1.00	-0.38	-1.00	-0.51	-0.80	-0.97
	(1.47)	(2.12)	(0.92)	(1.27)	(0.97)	(0.54)	(2.81)	(0.31)	(2.39)	(2.10)	(5.29)	(4.09)	(18.79)
φ	0.54	0.00	0.79	0.02	8.46	0.63	0.00	0.75	0.02	0.75	7.51	4.28	13.27
$\sigma^2_{mms,h}$	0.11	0.14	0.00	0.00	0.78	0.00	0.00	0.00	1.25	0.69	0.00	0.00	0.00
	(1.54)	(1.49)	(1.52)	(1.76)	(2.18)	(1.73)	(2.28)	(1.90)	(1.39)	(1.52)	(1.61)	(1.27)	(1.26)
$\sigma^2_{mms,\psi}$	0.10	0.09	0.49	0.07	0.50	0.48	0.00	0.48	0.03	0.40	0.03	0.05	0.28
	(0.47)	(0.63)	(0.49)	(0.62)	(0.49)	(0.42)	(1.66)	(0.22)	(1.05)	(1.02)	(1.78)	(0.96)	(5.31)
p-value	(0.43)	(0.97)	(0.36)	(0.70)	(0.75)	(0.01)	(0.14)	(0.38)	(0.91)	(0.19)	(0.57)	(0.20)	(0.11)

Table 18: 15-minute interval estimates for stock SLB. See paper for details.

Parameter	9.30	9.45	10.00	10.15	10.30	10.45	11.00	11.15	11.30	11.45	12.00	12.15	12.30
μ (%)	0.00	-0.01	0.00	0.01	-0.05	-0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	0.00
	(0.32)	(0.25)	(0.23)	(0.21)	(0.20)	(0.20)	(0.17)	(0.17)	(0.16)	(0.14)	(0.15)	(0.16)	(0.14)
α_0	0.54	0.47	0.35	0.29	0.27	0.37	0.26	0.21	0.32	0.23	0.21	0.23	0.19
	(0.08)	(0.05)	(0.05)	(0.04)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.03)	(0.03)	(0.04)	(0.02)
α_1 (%)	5.84	0.42	2.00	3.96	-0.23	-3.08	-1.93	-1.69	-4.33	-2.92	-2.23	-1.97	-2.38
	(1.78)	(1.48)	(1.71)	(1.89)	(1.26)	(1.47)	(1.70)	(1.21)	(1.55)	(0.99)	(0.96)	(1.06)	(0.77)
$\beta^\star$	-0.72	0.10	-0.81	-0.77	0.63	0.08	0.65	-0.76	-0.72	-0.45	-1.00	-0.81	-0.98
	(0.76)	(1.70)	(1.07)	(0.96)	(2.05)	(1.37)	(3.83)	(11.86)	(1.13)	(3.20)	(2.55)	(15.34)	(0.59)
φ	1.10	1.39	3.89	0.48	3.10	0.74	0.65	0.29	0.36	0.51	0.00	0.29	8.97
$\sigma^2_{mms,h}$	2.86	0.64	0.77	0.89	1.75	0.30	1.57	1.17	0.49	1.68	1.24	0.69	1.28
	(1.57)	(0.92)	(0.81)	(0.74)	(0.72)	(0.67)	(0.65)	(0.66)	(0.50)	(0.46)	(0.41)	(0.53)	(0.40)
$\sigma^2_{mms,\psi}$	0.90	0.05	0.39	0.38	0.03	0.07	0.01	0.25	0.23	0.20	0.30	0.23	0.28
	(0.40)	(0.62)	(0.29)	(0.21)	(0.41)	(0.32)	(0.66)	(1.65)	(0.24)	(0.43)	(0.33)	(2.20)	(0.09)
p-value	(0.51)	(0.28)	(0.80)	(0.81)	(0.23)	(0.99)	(0.87)	(0.51)	(0.93)	(0.87)	(0.86)	(0.88)	(0.70)

Table 19: 15-minute interval estimates for stock WMT. See paper for details.

Parameter	12.45	13.00	13.15	13.30	13.45	14.00	14.15	14.30	14.15	15.00	15.15	15.30	15.45
μ (%)	-0.00	-0.00	-0.00	-0.01	-0.00	0.00	-0.00	-0.01	-0.01	-0.00	-0.00	-0.00	-0.05
	(0.14)	(0.13)	(0.16)	(0.15)	(0.16)	(0.17)	(0.16)	(0.17)	(0.17)	(0.17)	(0.17)	(0.19)	(0.20)
α_0	0.23	0.18	0.28	0.24	0.27	0.22	0.27	0.31	0.24	0.24	0.26	0.25	0.16
	(0.03)	(0.04)	(0.05)	(0.03)	(0.04)	(0.04)	(0.04)	(0.05)	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)
α_1 (%)	-3.79	-1.36	-4.09	-3.04	-2.81	-0.57	-3.43	-3.66	-0.83	-1.04	-0.88	2.55	7.13
	(0.87)	(1.02)	(1.36)	(1.04)	(1.20)	(1.28)	(1.42)	(1.46)	(1.82)	(1.91)	(1.21)	(1.02)	(1.68)
$\beta^\star$	-0.41	-1.00	-0.64	-0.42	-0.55	0.25	-0.99	-0.62	-0.08	-0.41	0.20	0.05	-0.81
	(4.68)	(0.99)	(120.40)	(22.05)	(0.58)	(2.84)	(1.09)	(0.54)	(1.66)	(0.87)	(4.19)	(1.65)	(3.17)
φ	0.90	0.39	0.23	0.36	0.00	0.13	0.13	0.38	0.18	0.12	0.00	0.66	1.70
$\sigma^2_{mms,h}$	0.53	0.26	0.59	0.75	0.00	0.89	1.63	0.57	1.13	1.59	0.62	0.39	0.17
	(0.34)	(0.37)	(0.57)	(0.44)	(0.53)	(0.52)	(0.59)	(0.59)	(0.49)	(0.55)	(0.56)	(0.61)	(0.59)
$\sigma^2_{mms,\psi}$	0.21	0.25	0.17	0.16	0.14	0.02	0.30	0.20	0.11	0.19	0.00	0.02	0.24
	(0.64)	(0.13)	(19.85)	(3.03)	(0.13)	(0.46)	(0.20)	(0.13)	(0.26)	(0.14)	(0.80)	(0.32)	(0.35)
p-value	(0.74)	(0.95)	(0.94)	(0.34)	(0.37)	(0.92)	(0.88)	(0.85)	(0.55)	(0.95)	(0.61)	(0.62)	(0.68)

Table 20: 15-minute interval estimates for stock WMT. See paper for details.