USD/RUB   Brent

Alexander Cherkashin
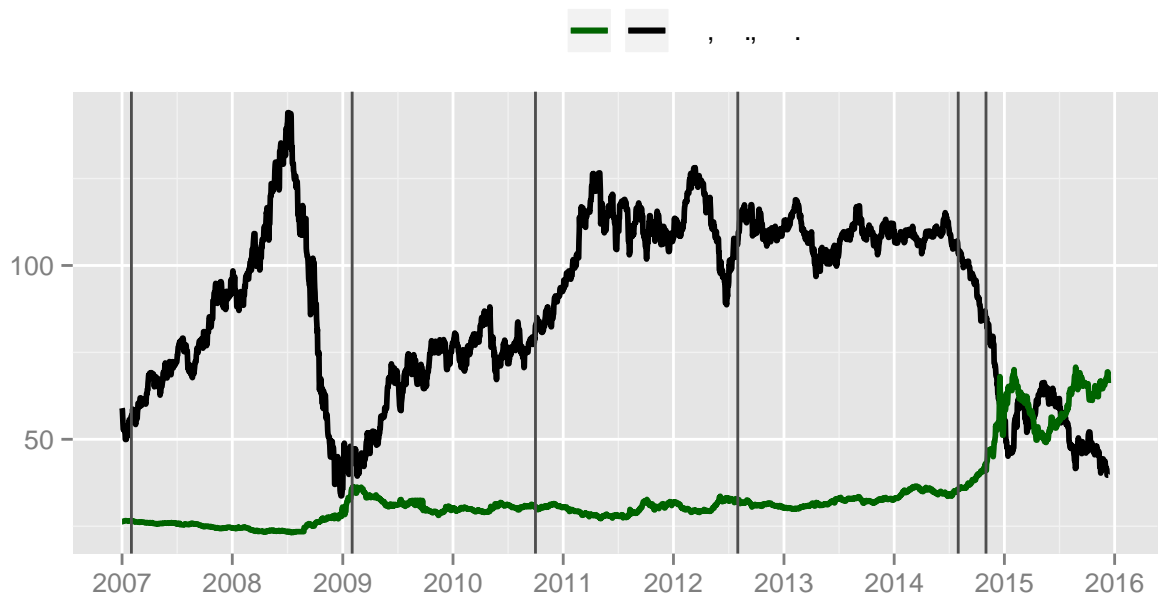
9 2015 .

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,   ,   [1]   [2] Brent   2007   . ,   X   ,   - () .   .

,   [3]. "+" -   , "-" - .   2013 .

,   . ,   2007   2008   ,   . ,   2009   ,   .   .

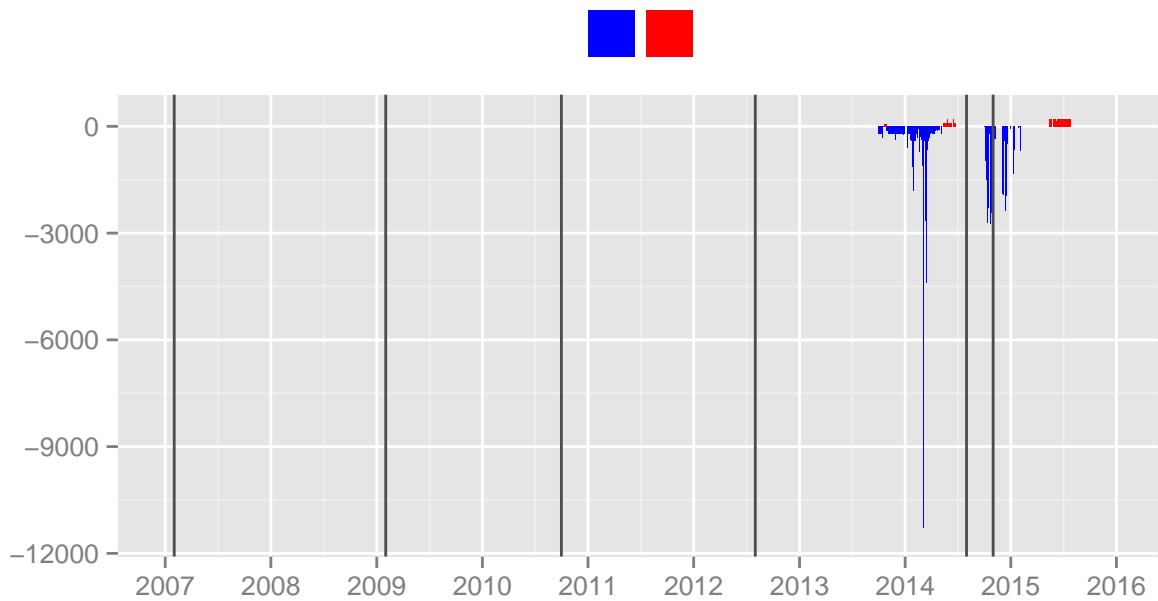,   :   ,   .   -   ,   ,   ,   .

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[1] Yahoo: https://beta.finance.yahoo.com/quote/USDRUB%3DX/news

[2] The Federal Reserve Bank of St. Louis: https://research.stlouisfed.org/fred2/series/DCOILBRENTEU

[3] : http://www.cbr.ru/hd_base/default.aspx?prtid=valint_day&pid=idkp_br&sid=ITM_45393
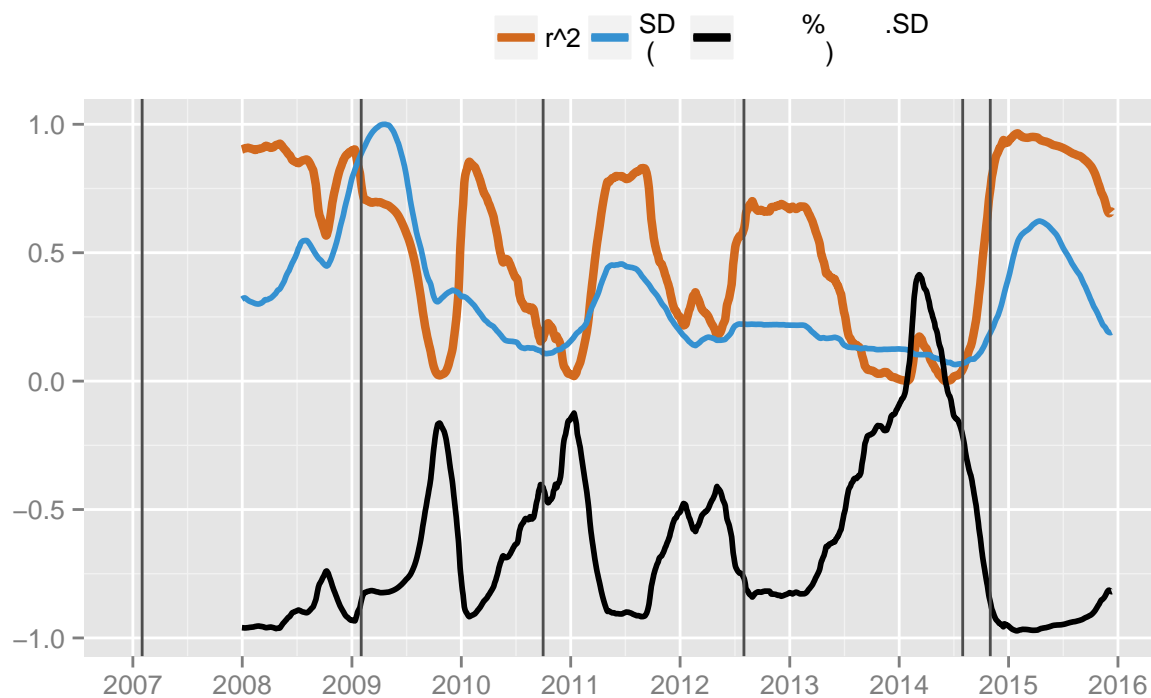
.USD

,   .   , , , 2008 , ,   2015.   ,   .   ,   , , , ,   , .

,   ? ,   4.
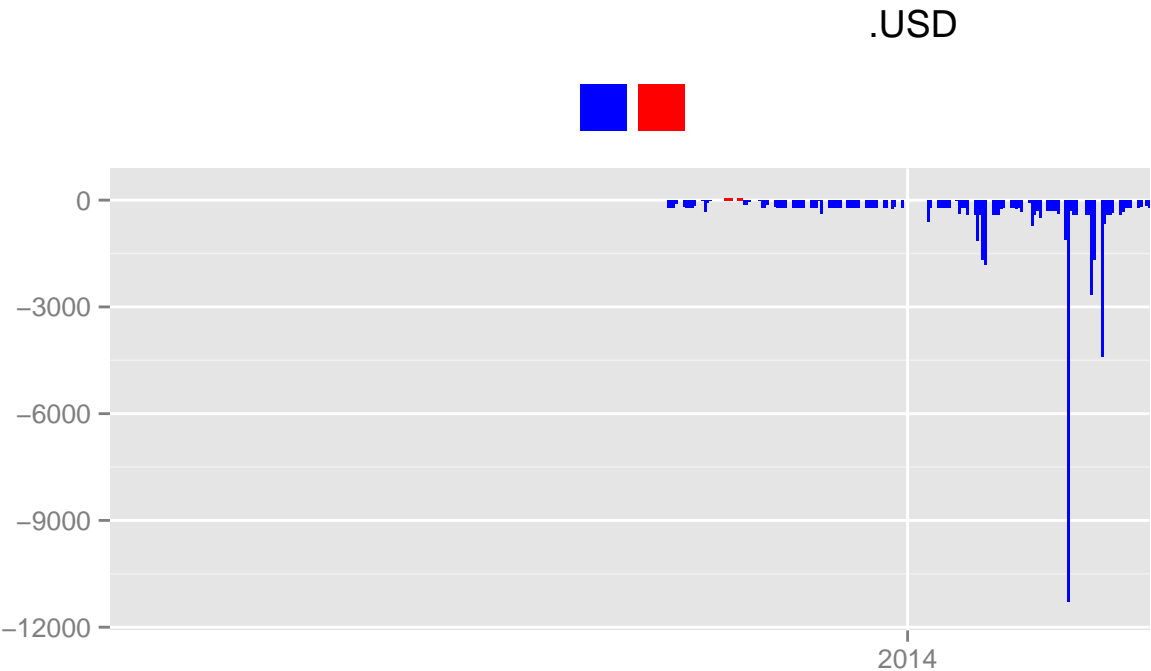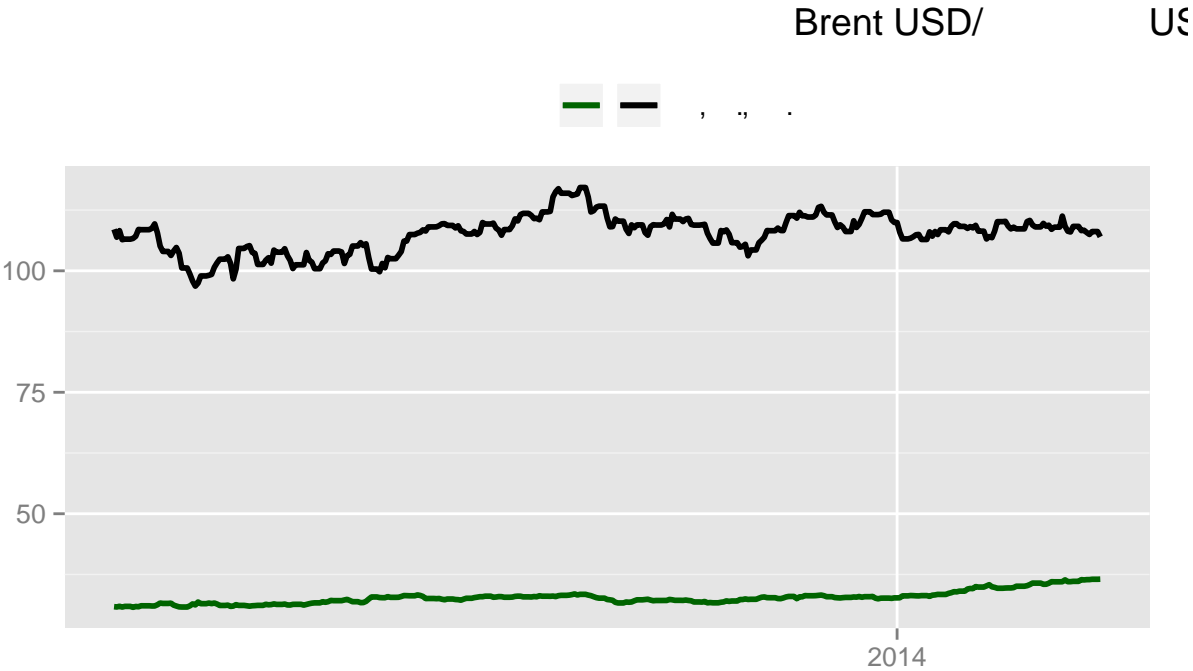
- -,   .   , ..   ,   , , , ,   , "" -   , .

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4 , , , ,   ,   ,   :   -   .   Naive method.   ,   .

- , "" . - , .

: [Bias–variance tradeoff](#). - (- "") "" - .

, 365 . , - , . , , 30 90 .

- . , .. , 364 , [5]. "" . , , 364 .

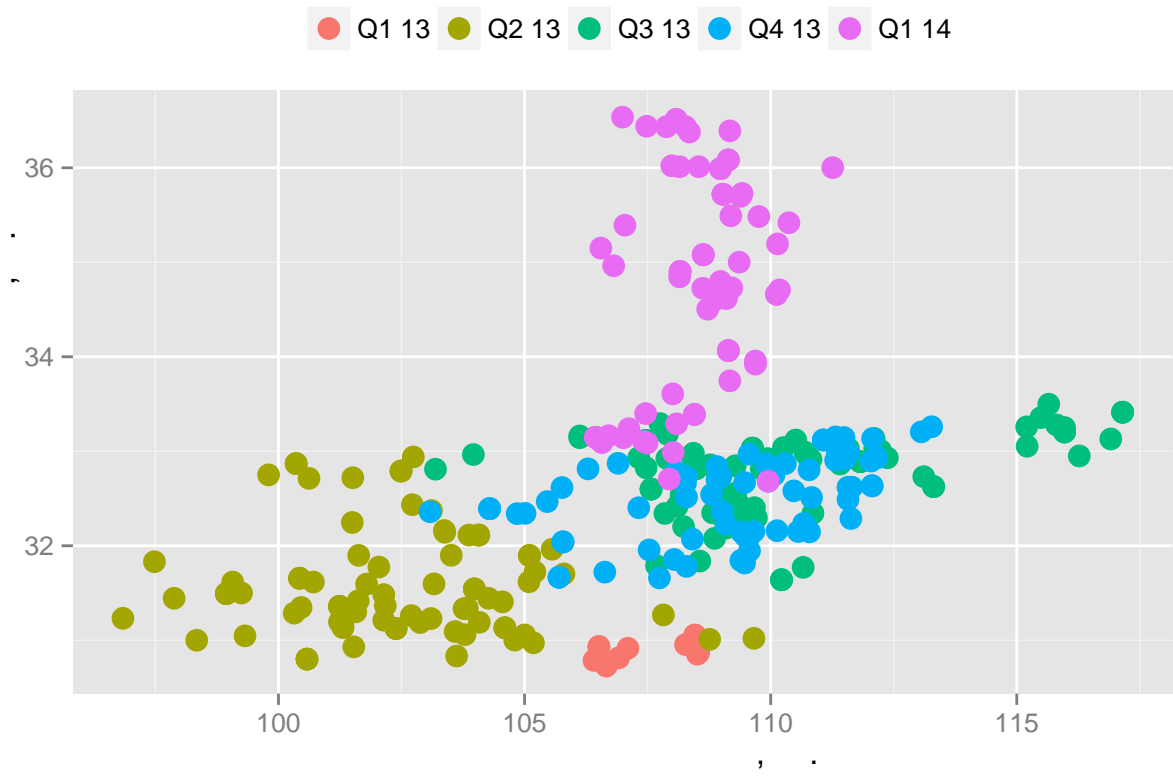r^2[6] . , . 1 - 100% , 0 - - .

, . , - ., , , , , "" ( ), - r^2. , , : - , . . , .
, .

, . , . , (:), . - 365 .

- . 365 . , - , . , . , .

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" 10 2014 , . , , ." -

: " 18 2014 , , 0 ."

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- . , , , , . 1. 2014 , , : 17 2014. , , : , !

, , : , .

[5]: . Y = b'*log(X). - , - . : , .
[6] .
[7] , , " ", , , . , , .

(18 2013 17 2014) :

Brent USD/ US

.USD

, . , , , ! , , .
:

Figure legend: Q1 13 · Q2 13 · Q3 13 · Q4 13 · Q1 14

. 2013 , , : - . [8] . 2014 - : .

2013 2014 , 5 . , 2014 ... , .

, , ( ) . . , , , , , : .

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[8] , - , .

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, 7,8 15 , , , . [9] . - - , . 1 .

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: - -, ; - -, [10] , ; - -, . " " .

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, , , , . . , . , , , , , " " .

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: - , . [11] . , , , , . , .

, , , , . . , 2007 2015 2 (9 8%). , , - , 8% [12] .

- Brent 20, 40 60 . 90 . , .

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[9] : Y = b'*X. , 2014, : .

[10] , . (bias) (variance).

[11] , . . , , , , , .

[12] .

95% ,   13 .

, , ,   100   ,   50 .   ,   20 , ,   80 .

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13   " ".   ,   , ,   95% . , ,   ,   ,   2016   . ,   .
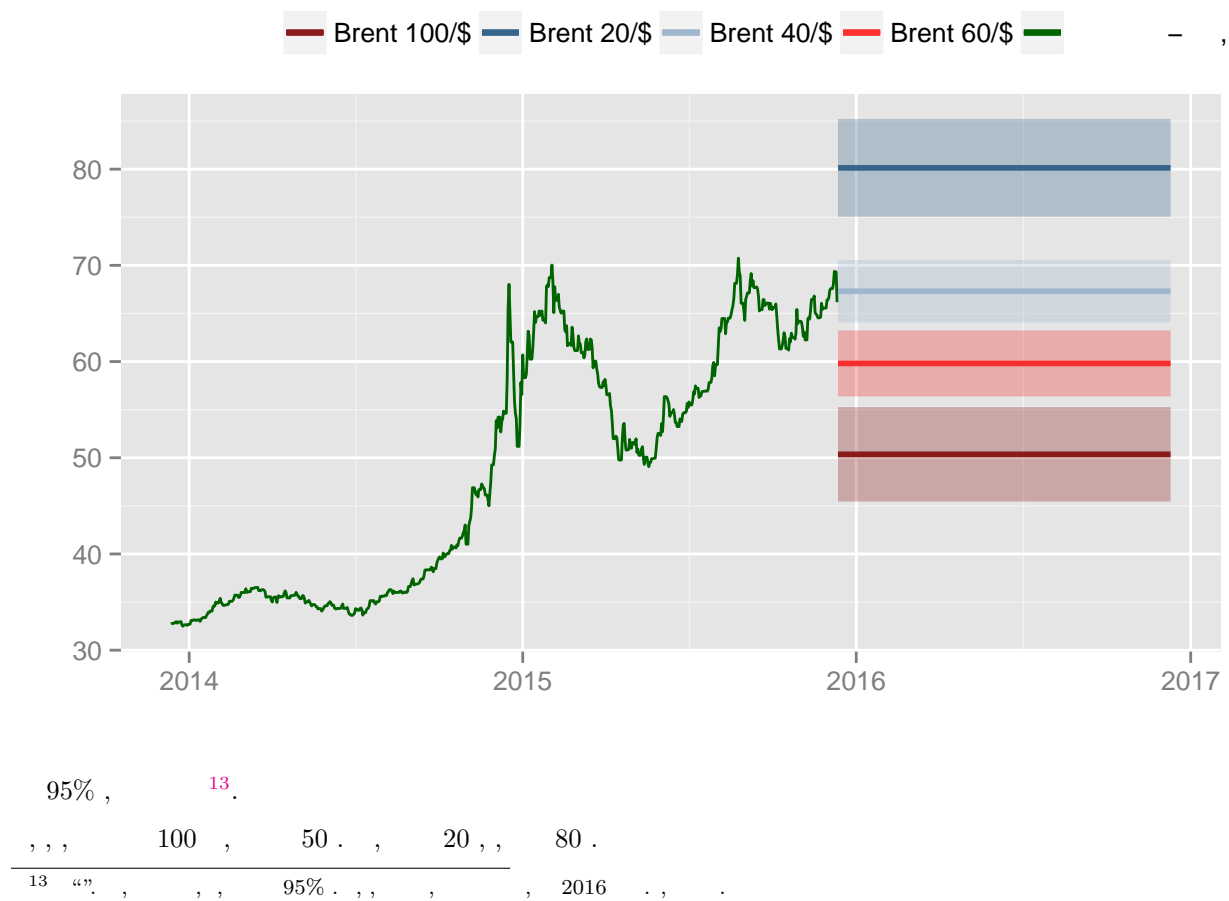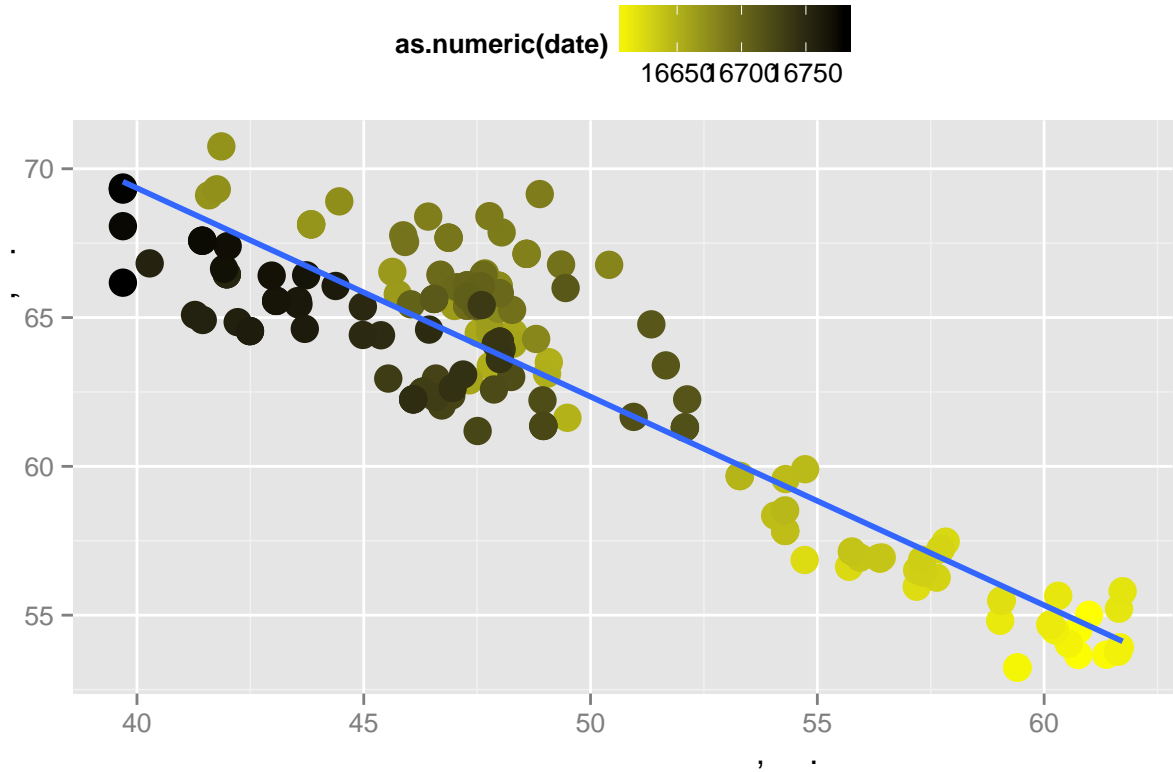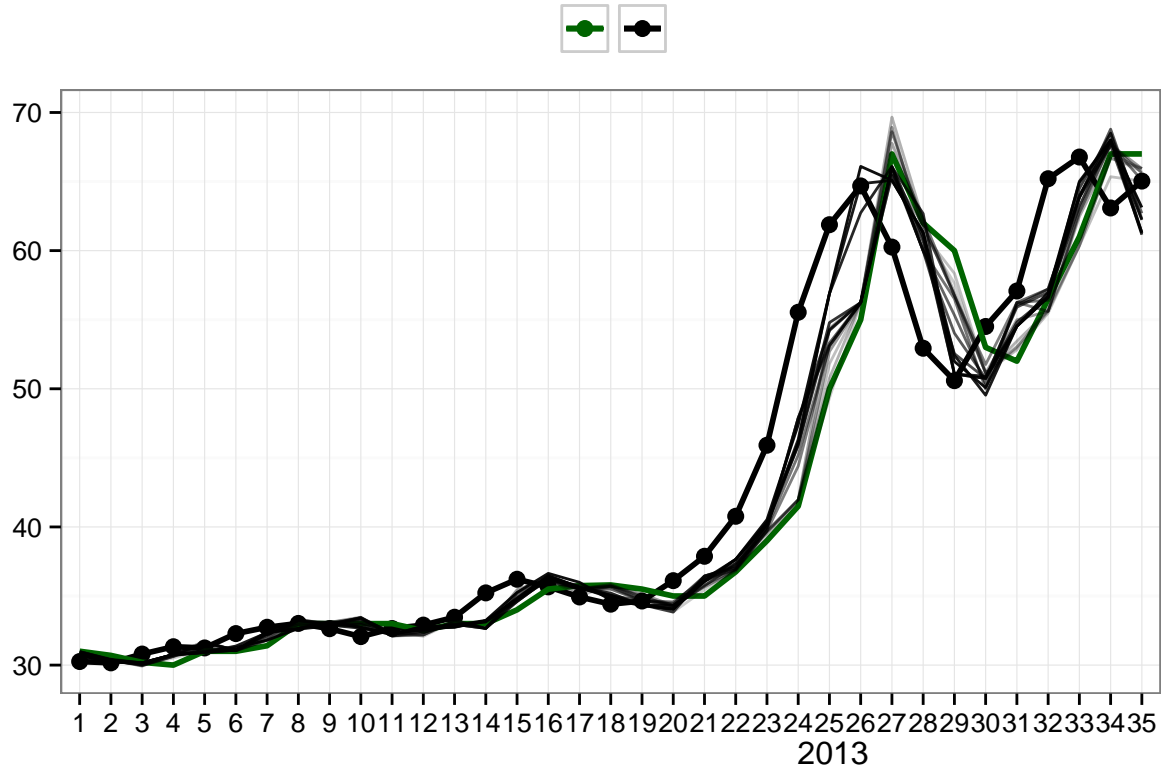
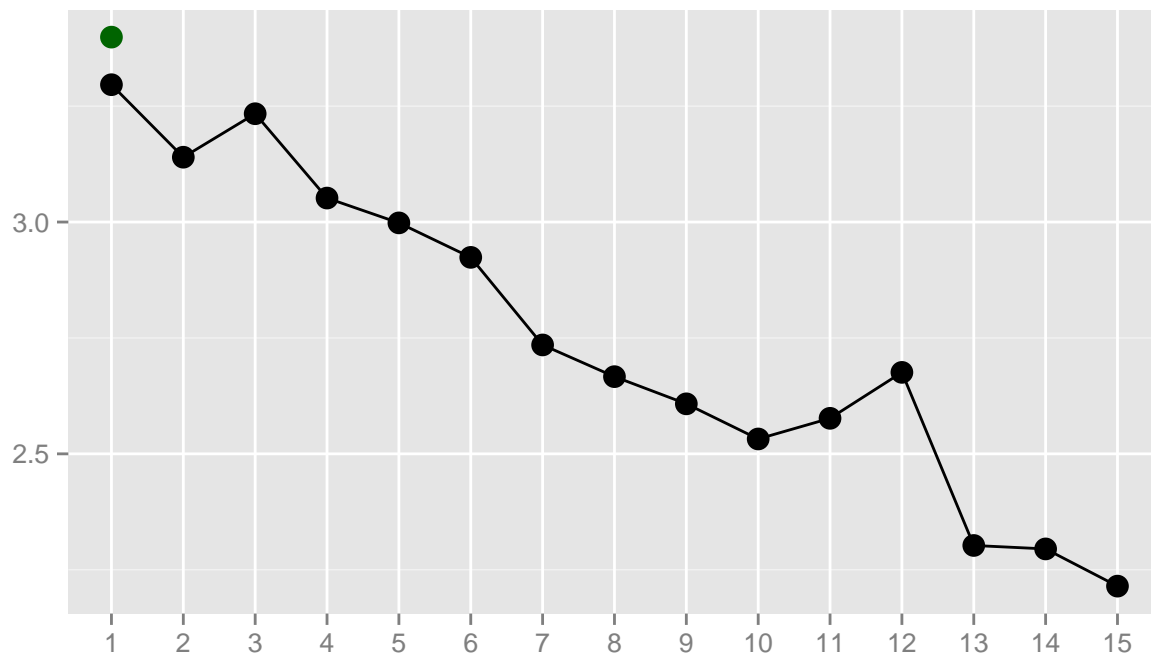, , - 8% . , . , .

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M .

1-, 2-, ..., 15- M-1 (,).

35 2013 2015. 35 .

, . , , . M-1 ( ), -2 ( ).

35 2013 . - , - , - , 1 15 ; - 1, - 15.

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- , , - , , , - .

, , " " 11:30.

Table 1: 1. USD/RUB , - , . , 4 .

			.01	.02	.03	.04	.05	.06	.07	.08	.09	.10	.11	.12	.13
.13	30.26	31.00	30.81	30.81	30.81	30.84	30.99	30.82	30.91	30.97	30.97	30.97	30.87	30.75	30.73
.13	30.16	30.70	30.37	30.37	30.37	30.37	30.37	30.37	30.37	30.37	30.37	30.42	30.36	30.25	30.25
.13	30.80	30.20	30.02	30.00	30.00	30.00	29.93	30.12	29.96	30.05	30.16	30.16	30.16	30.16	30.17
.13	31.33	30.00	30.51	30.64	30.64	30.64	30.79	30.70	30.62	30.76	30.76	30.76	30.76	30.76	30.75
.13	31.24	31.00	31.08	31.11	31.12	31.39	31.72	31.62	31.62	31.62	31.61	31.21	31.00	30.88	30.93
.13	32.28	31.00	31.04	31.04	31.04	31.04	31.04	31.04	31.08	31.08	31.08	31.08	31.08	31.08	31.08
.13	32.74	31.40	31.80	31.80	31.80	32.05	31.83	31.98	32.14	32.24	32.24	32.24	32.32	32.40	32.40
.13	33.02	33.00	32.71	32.85	32.95	33.22	33.16	33.22	33.22	33.22	33.32	33.08	32.91	32.59	32.64
.13	32.63	33.00	33.03	32.97	33.10	33.10	33.10	32.88	32.94	32.98	32.94	32.86	32.86	32.86	32.89
.13	32.06	33.00	33.25	33.25	33.25	33.37	33.47	33.39	33.43	33.43	33.43	33.32	33.06	32.96	32.67
.13	32.65	33.00	32.48	32.30	32.30	32.12	32.10	32.10	32.10	32.29	32.30	32.36	32.36	32.21	32.21
.13	32.89	32.50	32.08	32.18	32.18	32.18	32.18	32.35	32.45	32.38	32.55	32.55	32.55	32.66	32.81
.14	33.46	33.00	33.19	33.19	33.15	33.25	33.26	33.11	32.95	32.95	32.95	32.78	32.78	32.73	32.75
.14	35.23	33.00	32.66	32.66	32.66	32.66	32.66	32.66	32.66	32.66	32.66	33.15	33.21	33.21	33.21
.14	36.21	34.00	35.18	35.18	35.18	35.23	35.45	34.96	34.73	34.60	34.60	34.60	34.76	34.80	34.76

		.01	.02	.03	.04	.05	.06	.07	.08	.09	.10	.11	.12	.13	.14
.14	35.66	35.50	36.18	36.18	36.18	36.38	36.32	36.08	36.13	36.26	36.26	36.26	36.26	36.40	36.49
.14	34.93	35.75	35.61	35.02	35.25	35.52	35.50	35.50	35.50	35.47	35.55	35.75	35.56	35.62	35.62
.14	34.41	35.80	35.72	35.72	35.72	35.72	35.72	35.84	35.66	35.50	35.03	35.03	35.03	35.03	35.21
.14	34.64	35.50	34.74	34.74	34.89	35.01	35.14	34.90	34.66	34.66	34.66	34.33	34.37	34.32	34.32
.14	36.11	35.00	33.84	34.23	34.25	34.19	34.32	34.32	34.32	34.57	34.43	34.08	33.84	34.06	34.06
.14	37.88	35.00	35.44	35.73	35.73	35.73	35.66	35.80	36.11	36.25	36.45	36.45	36.45	36.05	36.09
.14	40.77	36.75	36.93	37.29	37.35	37.32	36.80	36.92	36.92	36.92	37.09	37.03	37.17	37.38	37.65
.14	45.91	39.00	39.38	39.66	39.55	39.70	39.70	39.70	39.98	39.74	39.98	39.98	40.21	40.21	40.21
.14	55.54	41.50	41.96	41.96	41.96	41.96	41.96	44.40	45.19	47.88	47.88	47.88	45.89	45.95	46.34
.15	61.88	50.00	49.32	51.81	50.77	54.38	52.69	53.11	53.11	53.11	53.31	54.21	54.28	54.79	56.89
.15	64.68	55.00	56.24	56.24	56.24	56.24	56.24	56.24	56.24	56.24	56.24	56.24	56.24	56.24	62.74
.15	60.26	67.00	68.93	68.93	69.66	67.77	65.45	68.61	66.04	66.04	66.04	65.78	65.45	66.06	66.10
.15	52.93	62.00	61.27	61.27	62.22	62.36	61.87	61.85	59.99	59.99	59.99	59.99	60.66	62.68	60.96
.15	50.59	60.00	57.65	58.35	56.99	56.75	56.75	56.75	56.52	55.33	54.03	52.54	51.07	51.07	51.07
.15	54.51	53.00	51.14	51.14	51.14	51.14	51.14	51.76	49.98	50.36	50.75	50.75	50.75	50.75	50.91
.15	57.08	52.00	52.97	52.82	53.44	53.06	54.99	56.25	56.25	56.25	56.04	55.91	54.82	54.53	54.53
.15	65.20	56.50	55.84	55.48	55.66	55.60	55.60	55.60	56.41	57.22	57.22	56.98	56.67	56.67	56.67
.15	66.77	61.00	60.35	60.35	60.35	62.47	62.92	62.72	63.86	63.84	63.84	63.84	64.50	63.21	65.02
.15	63.09	67.00	66.72	65.35	66.68	67.01	67.69	67.69	67.69	68.49	68.79	67.62	68.50	68.01	68.01
.15	65.03	67.00	65.74	65.03	65.94	65.94	65.94	65.62	65.10	62.71	62.29	61.30	61.30	61.30	61.15

Table 2: 2.   .   ,   4 .

		.01	.02	.03	.04	.05	.06	.07	.08	.09	.10	.11	.12	.13
.13	30.26	0.74	0.55	0.55	0.55	0.58	0.74	0.57	0.65	0.71	0.71	0.71	0.61	0.49
.13	30.16	0.54	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.26	0.20	0.09
.13	30.80	-0.60	-0.78	-0.80	-0.80	-0.80	-0.87	-0.68	-0.84	-0.75	-0.64	-0.64	-0.64	-0.64
.13	31.33	-1.33	-0.82	-0.69	-0.69	-0.69	-0.54	-0.63	-0.71	-0.57	-0.57	-0.57	-0.57	-0.57
.13	31.24	-0.24	-0.16	-0.13	-0.12	0.15	0.48	0.38	0.38	0.38	0.37	-0.03	-0.24	-0.36
.13	32.28	-1.28	-1.24	-1.24	-1.24	-1.24	-1.24	-1.24	-1.20	-1.20	-1.20	-1.20	-1.20	-1.20
.13	32.74	-1.34	-0.94	-0.94	-0.94	-0.69	-0.90	-0.76	-0.60	-0.50	-0.50	-0.50	-0.41	-0.34
.13	33.02	-0.02	-0.31	-0.16	-0.07	0.20	0.14	0.21	0.21	0.21	0.31	0.07	-0.10	-0.43
.13	32.63	0.37	0.40	0.34	0.46	0.46	0.46	0.25	0.30	0.35	0.31	0.23	0.23	0.23
.13	32.06	0.94	1.18	1.18	1.19	1.31	1.40	1.33	1.37	1.37	1.37	1.26	1.00	0.90
.13	32.65	0.35	-0.16	-0.35	-0.35	-0.52	-0.55	-0.55	-0.55	-0.35	-0.35	-0.28	-0.29	-0.43
.13	32.89	-0.39	-0.82	-0.71	-0.71	-0.71	-0.71	-0.54	-0.44	-0.51	-0.35	-0.35	-0.35	-0.23
.14	33.46	-0.46	-0.27	-0.27	-0.32	-0.22	-0.20	-0.35	-0.51	-0.51	-0.51	-0.69	-0.68	-0.73
.14	35.23	-2.23	-2.57	-2.57	-2.57	-2.57	-2.57	-2.57	-2.57	-2.57	-2.57	-2.07	-2.02	-2.02
.14	36.21	-2.21	-1.03	-1.03	-1.03	-0.98	-0.76	-1.25	-1.48	-1.61	-1.61	-1.61	-1.45	-1.42
.14	35.66	-0.16	0.52	0.52	0.52	0.72	0.66	0.42	0.46	0.60	0.60	0.60	0.60	0.74
.14	34.93	0.82	0.67	0.09	0.32	0.58	0.57	0.57	0.57	0.54	0.62	0.82	0.63	0.69
.14	34.41	1.39	1.31	1.31	1.31	1.31	1.31	1.43	1.25	1.09	0.63	0.63	0.63	0.63
.14	34.64	0.86	0.10	0.10	0.25	0.37	0.50	0.27	0.02	0.02	0.02	-0.31	-0.27	-0.32
.14	36.11	-1.11	-2.27	-1.88	-1.86	-1.92	-1.79	-1.79	-1.79	-1.54	-1.69	-2.04	-2.28	-2.05
.14	37.88	-2.88	-2.43	-2.15	-2.15	-2.15	-2.22	-2.08	-1.77	-1.63	-1.43	-1.43	-1.43	-1.83
.14	40.77	-4.02	-3.84	-3.48	-3.42	-3.45	-3.97	-3.85	-3.85	-3.85	-3.68	-3.74	-3.60	-3.40
.14	45.91	-6.91	-6.53	-6.25	-6.37	-6.22	-6.22	-6.22	-5.93	-6.17	-5.93	-5.93	-5.70	-5.70
.14	55.54	-14.04	-13.58	-13.58	-13.58	-13.58	-13.58	-11.14	-10.35	-7.66	-7.66	-7.66	-9.65	-9.59
.15	61.88	-11.88	-12.56	-10.07	-11.11	-7.50	-9.18	-8.77	-8.77	-8.77	-8.57	-7.67	-7.60	-7.08
.15	64.68	-9.68	-8.45	-8.45	-8.45	-8.45	-8.45	-8.45	-8.45	-8.45	-8.45	-8.45	-8.45	-8.45
.15	60.26	6.74	8.67	8.67	9.41	7.52	5.19	8.35	5.79	5.79	5.79	5.53	5.19	5.80

			.01	.02	.03	.04	.05	.06	.07	.08	.09	.10	.11	.12	.
.15	52.93	9.07	8.34	8.34	9.29	9.43	8.94	8.91	7.06	7.06	7.06	7.06	7.73	9.75	8.0
.15	50.59	9.41	7.06	7.76	6.40	6.16	6.16	6.16	5.93	4.74	3.44	1.95	0.48	0.48	0.4
.15	54.51	-1.51	-3.37	-3.37	-3.37	-3.37	-3.37	-2.75	-4.53	-4.15	-3.76	-3.76	-3.76	-3.76	-3.8
.15	57.08	-5.08	-4.11	-4.26	-3.64	-4.02	-2.09	-0.83	-0.83	-0.83	-1.04	-1.17	-2.26	-2.55	-2.8
.15	65.20	-8.70	-9.36	-9.73	-9.55	-9.60	-9.60	-9.60	-8.79	-7.98	-7.99	-8.22	-8.54	-8.54	-8.8
.15	66.77	-5.77	-6.43	-6.43	-6.43	-4.31	-3.86	-4.06	-2.91	-2.94	-2.94	-2.94	-2.28	-3.57	-1.7
.15	63.09	3.91	3.63	2.26	3.59	3.92	4.60	4.60	4.60	5.40	5.71	4.53	5.41	4.92	4.9
.15	65.03	1.97	0.70	0.00	0.91	0.91	0.91	0.59	0.06	-2.33	-2.74	-3.74	-3.74	-3.74	-3.8