

## 国泰君安191因子回测-171-180

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## 1 Alpha171

$$Alpha = ((-1 * ((LOW - CLOSE) * (OPEN^5))) / ((CLOSE - HIGH) * (CLOSE^5))) \quad (1)$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-10.0	-0.17	-0.87	30.31	-0.07(-0.005)	24.58	0.6	-1.15	-0.01	498 X 1207	28.01	14.01	-29.75	0.0008
20110101-20111231	10.0	-10.0	1.11	5.7	31.27	0.66(0.041)	12.06	0.57	7.3	0.28	523 X 1488	-39.74	-39.34	51.15	0.0008
20120101-20121231	10.0	-10.0	0.08	0.43	51.0	0.06(0.004)	21.44	0.58	0.31	0.01	676 X 1540	3.8	3.25	-3.02	0.0002
20130101-20131231	10.0	-10.0	1.73	9.06	31.73	0.9(0.057)	17.42	0.55	11.44	0.48	618 X 1638	40.94	19.03	-22.8	0.0016
20140101-20141231	10.0	-10.0	0.8	4.06	35.66	0.32(0.021)	24.66	0.58	4.56	0.11	760 X 1429	33.5	35.54	-25.38	0.0009
20150101-20151231	10.03	-10.05	-2.74	-15.46	63.49	-0.7(-0.044)	76.08	0.57	-8.8	-0.35	649 X 1473	47.52	46.78	-75.28	-0.0019
20160101-20161231	10.0	-10.0	1.14	5.82	45.4	0.54(0.034)	29.72	0.62	5.12	0.2	792 X 1712	-29.85	-15.42	41.49	0.0009
20170101-20171231	10.0	-10.0	2.12	10.87	44.77	1.07(0.068)	15.8	0.57	9.71	0.53	944 X 1978	-19.25	0.88	40.99	0.0013
20180101-20181231	10.01	-10.0	1.31	6.69	51.87	0.63(0.04)	18.03	0.55	5.18	0.22	1154 X 2060	-36.79	-38.75	50.25	0.0003
20190101-20191231	10.01	-10.0	5.7	29.32	62.37	1.92(0.122)	28.66	0.61	18.74	1.32	1291 X 2112	38.48	26.71	19.93	0.0025
20200101-20200331	10.03	-10.07	1.73	38.6	60.98	2.0(0.126)	19.48	0.6	24.35	1.59	1246 X 2177	-11.89	-12.47	85.96	0.0034
20100104-20200331	10.01	-10.01	12.81	6.33	45.21	0.49(0.031)	79.92	0.58	5.69	0.19	802 X 1676	6.17	4.85	6.69	0.0008

Figure 1: 回测结果

Corr	ISSharpe	Semi05	OSSharpe	Fitness	OSdays	ID
0.2136	3.71	5.91	3.16	2.41	151	213024_agen.ZSAlpha_14
0.2004	3.43	4.55	3.87	2.38	180	211919_my_199
0.1901	2.39	4.49	4.34	1.8	151	213024_agen.ZSAlpha_26

Figure 2: 相关性结果

## 2 Alpha172

$$TR = MAX(MAX(HIGH - LOW, ABS(HIGH - DELAY(CLOSE, 1))), ABS(LOW - DELAY(CLOSE, 1)))$$

$$LD = Delay(LOW, 1) - LOW$$

$$HD = HIGH - delay(HIGH, 1)$$

$$Alpha = MEAN(ABS(SUM((LD > 0 \& LD > HD)? LD : 0, 14) * 100 / SUM(TR, 14) - SUM((HD > 0 \& HD > LD)? HD : 0, 14) * 100 / SUM(TR, 14)) / (SUM((LD > 0 \& LD > HD)? LD : 0, 14) * 100 / SUM(TR, 14) + SUM((HD > 0 \& HD > LD)? HD : 0, 14) * 100 / SUM(TR, 14)) * 100, 6) \quad (2)$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-10.0	0.11	0.58	25.25	0.16(0.01)	10.08	0.43	0.92	0.02	798 X 969	16.59	14.01	-15.43	0.0007
20110101-20111231	10.0	-10.0	-0.07	-0.34	24.15	-0.15(-0.01)	5.83	0.49	-0.56	-0.02	960 X 1131	-34.26	-39.34	33.58	0.0
20120101-20121231	10.0	-10.0	-0.52	-2.69	25.05	-1.28(-0.081)	8.82	0.47	-4.29	-0.42	1043 X 1286	1.23	3.25	-6.6	-0.004
20130101-20131231	9.99	-10.0	-1.53	-8.06	24.61	-2.75(-0.174)	16.17	0.47	-13.1	-1.57	1075 X 1312	14.82	19.03	-30.93	-0.0122
20140101-20141231	9.99	-10.0	0.02	0.08	23.99	0.04(0.002)	7.85	0.44	0.14	0.0	1064 X 1299	37.88	35.54	-37.67	-0.0028
20150101-20151231	9.93	-10.01	-0.5	-2.52	23.1	-0.39(-0.025)	21.28	0.47	-4.42	-0.13	1100 X 1340	66.88	46.78	-71.45	-0.0061
20160101-20161231	9.99	-10.01	0.48	2.43	22.94	0.99(0.063)	6.64	0.47	4.24	0.32	1270 X 1454	-4.29	-15.42	9.15	0.0025
20170101-20171231	10.0	-10.0	0.18	0.92	22.02	0.49(0.031)	3.82	0.52	1.67	0.1	1439 X 1669	-16.4	0.88	18.22	0.0018
20180101-20181231	9.99	-10.01	0.42	2.15	23.69	1.0(0.063)	8.69	0.51	3.63	0.3	1562 X 1851	-37.56	-38.75	41.8	0.0035
20190101-20191231	9.99	-10.0	-1.02	-5.24	24.79	-2.45(-0.155)	14.02	0.45	-8.45	-1.12	1634 X 1973	16.54	26.71	-27.0	-0.0073
20200101-20200331	9.99	-10.01	-0.08	-1.75	24.95	-0.46(-0.029)	6.71	0.5	-2.77	-0.12	1696 X 1985	-16.17	-12.47	12.69	-0.0033
20100104-20200331	9.99	-10.0	-2.52	-1.26	23.98	-0.4(-0.026)	45.67	0.47	-2.11	-0.09	1206 X 1442	5.59	4.85	-8.11	-0.0024

Figure 3: 回测结果

-0.4704	4.37	5.47	3.79	2.59	105	214821_pv_model_3_mod_gen6_191114_151
-0.4856	3.78	4.91	1.88	2.42	104	214969_pv_model_8_mod_gen2_191114_228
-0.4904	5.26	6.09	5.42	2.78	103	215021_pv_model_10_gen4_191114_130
+-----+-----+-----+-----+-----+-----+						

Figure 4: 相关性结果

### 3 Alpha173

$$Alpha = 3 * SMA(CLOSE, 13, 2) - 2 * SMA(SMA(CLOSE, 13, 2), 13, 2) + SMA(SMA(SMA(LOG(CLOSE), 13, 2), 13, 2), 13, 2) \quad (3)$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-10.0	-2.31	-11.91	1.35	-1.81(-0.114)	25.25	0.38	-354.22	-5.38	526 X 1290	-1.41	14.01	-22.42	-0.0038
20110101-20111231	10.0	-10.0	-0.41	-2.08	0.9	-0.42(-0.026)	12.48	0.48	-92.98	-0.63	608 X 1538	-39.1	-39.34	34.94	-0.0008
20120101-20121231	10.0	-10.0	-0.46	-2.39	0.72	-0.5(-0.032)	16.65	0.44	-133.14	-0.92	630 X 1744	0.67	3.25	-5.44	-0.0014
20130101-20131231	10.0	-10.0	-1.35	-7.09	0.85	-1.22(-0.077)	17.58	0.45	-333.4	-3.53	630 X 1817	13.51	19.03	-27.68	-0.0023
20140101-20141231	9.99	-10.0	-0.48	-2.35	1.1	-0.38(-0.024)	16.69	0.47	-88.59	-0.55	848 X 1663	34.54	35.54	-39.39	-0.0012
20150101-20151231	9.99	-9.97	-2.1	-10.68	2.01	-0.91(-0.057)	61.34	0.47	-214.46	-2.09	905 X 1800	64.53	46.78	-86.23	-0.0015
20160101-20161231	9.99	-9.96	-1.68	-8.6	1.04	-1.53(-0.096)	32.55	0.39	-330.78	-4.38	895 X 1970	-32.53	-15.42	15.4	-0.0023
20170101-20171231	9.99	-9.96	-0.23	-1.18	0.97	-0.25(-0.016)	9.06	0.48	-48.98	-0.27	866 X 2384	-24.41	0.88	22.13	-0.0009
20180101-20181231	10.0	-9.99	-1.37	-7.05	1.1	-1.41(-0.089)	22.15	0.47	-257.2	-3.57	823 X 2690	-49.83	-38.75	35.75	-0.0016
20190101-20191231	10.0	-9.99	-0.64	-3.26	1.15	-0.64(-0.04)	14.38	0.44	-113.81	-1.07	855 X 2762	21.73	26.71	-28.31	-0.0012
20200101-20200331	10.0	-9.98	-0.61	-13.16	1.36	-2.23(-0.141)	8.74	0.33	-388.14	-6.94	882 X 2807	-35.42	-12.47	9.07	-0.0045
20100104-20200331	10.0	-9.99	-11.63	-5.83	1.12	-0.91(-0.058)	121.05	0.44	-208.1	-2.08	762 X 1986	-2.03	4.85	-9.66	-0.0018

Figure 5: 回测结果

-0.3196	4.35	2.96	2.43	2.59	102	215063_qh45
-0.352	3.43	4.55	3.87	2.38	180	211919_my_199
-0.3979	2.39	4.49	4.34	1.8	151	213024_agen.ZSAlpha_26

Figure 6: 相关性结果

### 4 Alpha174

$$Alpha = SMA((CLOSE > DELAY(CLOSE, 1)?STD(CLOSE, 20) : 0), 20, 1) \quad (4)$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-10.0	-2.21	-11.44	3.74	-1.73(-0.109)	23.82	0.36	-122.49	-3.02	535 X 1281	-0.47	14.01	-22.41	-0.0037
20110101-20111231	10.0	-10.0	-0.6	-3.09	3.67	-0.6(-0.038)	13.56	0.49	-33.7	-0.55	666 X 1480	-41.02	-39.34	34.84	-0.0007
20120101-20121231	10.0	-10.0	-0.26	-1.31	3.41	-0.27(-0.017)	16.27	0.46	-15.54	-0.17	677 X 1697	3.05	3.25	-5.69	-0.001
20130101-20131231	10.0	-10.0	-1.51	-7.93	4.07	-1.37(-0.087)	16.96	0.46	-77.92	-1.91	639 X 1808	12.03	19.03	-27.88	-0.0023
20140101-20141231	9.97	-9.99	-1.97	-10.02	4.57	-1.55(-0.098)	21.88	0.38	-88.15	-2.29	830 X 1682	21.53	35.54	-41.58	-0.0027
20150101-20151231	9.99	-9.97	-1.23	-6.29	4.23	-0.59(-0.037)	40.45	0.48	-59.85	-0.72	884 X 1820	68.93	46.78	-81.75	-0.0001
20160101-20161231	9.99	-9.95	-2.05	-10.53	3.7	-1.61(-0.102)	33.32	0.36	-113.76	-2.71	900 X 1965	-36.25	-15.42	15.3	-0.0022
20170101-20171231	9.99	-9.95	-0.35	-1.77	4.77	-0.38(-0.024)	8.29	0.43	-14.87	-0.23	879 X 2371	-25.36	0.88	21.92	-0.0003
20180101-20181231	10.0	-9.99	-1.17	-6.02	3.97	-1.09(-0.069)	22.78	0.46	-60.72	-1.34	893 X 2619	-50.78	-38.75	38.77	-0.0007
20190101-20191231	10.0	-9.98	-1.35	-6.88	4.32	-1.03(-0.065)	25.55	0.41	-64.11	-1.3	901 X 2715	14.73	26.71	-28.6	-0.0015
20200101-20200331	10.0	-9.98	-0.38	-8.27	4.72	-1.14(-0.072)	7.13	0.38	-70.36	-1.51	927 X 2762	-26.18	-12.47	9.61	-0.0029
20100104-20200331	9.99	-9.98	-13.09	-6.57	4.06	-1.0(-0.064)	135.69	0.43	-64.83	-1.28	784 X 1963	-3.91	4.85	-9.25	-0.0015

Figure 7: 回测结果

-0.3418	2.39	4.49	4.34	1.8	151	213024_agen.ZSAlpha_26
-0.3489	2.34	3.86	3.76	1.64	151	213024_agen.ZSAlpha_25
-0.3702	3.71	5.91	3.16	2.41	151	213024_agen.ZSAlpha_14

Figure 8: 相关性结果

## 5 Alpha175

$$\text{Alpha} = \text{MEAN}(\text{MAX}(\text{MAX}((\text{HIGH} - \text{LOW}), \text{ABS}(\text{DELAY}(\text{CLOSE}, 1) - \text{HIGH})), \text{ABS}(\text{DELAY}(\text{CLOSE}, 1) - \text{LOW})), 6) \quad (5)$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-10.0	-2.47	-12.74	7.22	-1.87(-0.118)	25.83	0.36	-70.55	-2.49	549 X 1258	-0.52	14.01	-24.96	-0.0038
20110101-20111231	10.0	-10.0	-0.55	-2.84	6.89	-0.53(-0.034)	13.77	0.47	-16.51	-0.34	653 X 1486	-40.34	-39.34	34.65	-0.0005
20120101-20121231	10.0	-10.0	-0.42	-2.13	6.94	-0.42(-0.026)	17.91	0.44	-12.34	-0.23	667 X 1703	2.09	3.25	-6.37	-0.0012
20130101-20131231	9.99	-10.0	-1.26	-6.61	7.27	-1.09(-0.069)	15.97	0.45	-36.38	-1.04	636 X 1810	15.27	19.03	-28.48	-0.002
20140101-20141231	9.92	-10.0	-2.59	-13.19	9.32	-2.0(-0.127)	28.98	0.39	-56.97	-2.38	838 X 1672	14.72	35.54	-41.02	-0.0031
20150101-20151231	9.98	-9.99	-1.94	-10.12	7.88	-0.82(-0.052)	49.75	0.47	-50.46	-0.93	883 X 1820	61.04	46.78	-80.87	-0.0001
20160101-20161231	9.99	-9.98	-2.24	-11.48	7.91	-1.67(-0.106)	35.64	0.37	-58.06	-2.01	897 X 1968	-37.61	-15.42	14.67	-0.0023
20170101-20171231	9.99	-9.99	-1.11	-5.7	9.26	-1.09(-0.069)	13.25	0.42	-24.61	-0.86	873 X 2375	-30.37	0.88	18.99	-0.0017
20180101-20181231	9.99	-10.0	-1.79	-9.21	8.89	-1.71(-0.108)	25.34	0.48	-41.47	-1.74	878 X 2634	-54.24	-38.75	35.73	-0.0015
20190101-20191231	9.99	-10.0	-1.83	-9.33	8.53	-1.42(-0.09)	28.07	0.41	-43.9	-1.48	904 X 2712	12.04	26.71	-30.75	-0.0021
20200101-20200331	9.98	-10.0	-0.65	-13.88	7.97	-2.22(-0.14)	9.21	0.34	-70.61	-2.93	915 X 2773	-36.74	-12.47	8.58	-0.0047
20100104-20200331	9.99	-10.0	-16.85	-8.47	8.01	-1.23(-0.078)	172.3	0.42	-42.27	-1.26	781 X 1964	-6.56	4.85	-10.37	-0.0019

Figure 9: 回测结果

-0.3772	2.39	4.49	4.34	1.8	151	213024_agen.ZSAlpha_26
-0.398	3.71	5.91	3.16	2.41	151	213024_agen.ZSAlpha_14
-0.4216	2.34	3.86	3.76	1.64	151	213024_agen.ZSAlpha_25

Histogram

Figure 10: 相关性结果

## 6 Alpha176

$$\text{Alpha} = \text{CORR}(\text{RANK}(((\text{CLOSE} - \text{TSMIN}(\text{LOW}, 12))/(\text{TSMAX}(\text{HIGH}, 12) - \text{TSMIN}(\text{LOW}, 12)))), \text{RANK}(\text{VOLUME}), 6) \quad (6)$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-10.0	-2.6	-13.42	63.29	-6.35(-0.402)	26.18	0.32	-8.48	-2.92	923 X 693	1.59	14.01	-28.42	-0.0237
20110101-20111231	10.0	-10.0	-2.11	-10.82	62.22	-6.98(-0.441)	21.55	0.34	-6.96	-2.91	1069 X 848	-44.22	-39.34	22.58	-0.0204
20120101-20121231	10.0	-10.0	-2.32	-11.94	62.14	-8.01(-0.507)	24.06	0.3	-7.68	-3.51	1219 X 978	-5.12	3.25	-18.75	-0.0231
20130101-20131231	10.0	-10.0	-2.35	-12.37	61.02	-8.2(-0.518)	23.77	0.29	-8.11	-3.69	1323 X 1001	15.35	19.03	-40.1	-0.0214
20140101-20141231	10.0	-10.0	-1.48	-7.56	61.17	-4.92(-0.311)	16.72	0.32	-4.94	-1.73	1280 X 984	30.13	35.54	-45.25	-0.0139
20150101-20151231	10.01	-9.96	-2.23	-11.42	63.32	-4.42(-0.279)	22.28	0.36	-7.23	-1.88	1293 X 942	63.52	46.78	-86.78	-0.0164
20160101-20161231	10.0	-9.99	-2.5	-12.82	61.9	-8.83(-0.558)	25.64	0.26	-8.29	-4.02	1463 X 1104	-21.49	-15.42	-4.16	-0.0225
20170101-20171231	10.0	-9.99	-2.22	-11.37	60.96	-8.87(-0.561)	22.2	0.27	-7.46	-3.83	1671 X 1309	-27.3	0.88	4.57	-0.0211
20180101-20181231	10.0	-10.0	-1.57	-8.08	60.38	-5.56(-0.351)	15.74	0.35	-5.35	-2.03	1842 X 1481	-43.76	-38.75	27.61	-0.0137
20190101-20191231	10.0	-9.99	-1.65	-8.44	60.87	-6.18(-0.391)	16.66	0.34	-5.55	-2.3	2008 X 1576	15.25	26.71	-32.15	-0.013
20200101-20200331	10.01	-9.99	-0.05	-1.11	60.88	-0.61(-0.038)	2.59	0.48	-0.73	-0.08	2073 X 1595	-11.94	-12.47	9.75	-0.0022
20100104-20200331	10.0	-9.99	-21.09	-10.59	61.71	-6.27(-0.397)	211.05	0.32	-6.87	-2.6	1425 X 1104	-1.85	4.85	-19.34	-0.0185

Figure 11: 回测结果

-0.6395	4.62	5.89	2.36	2.24	102	215072_fac252
-0.6502	6.95	10.61	2.54	3.58	134	213793_vlv2_191003_22
-0.8604	5.92	6.79	2.79	2.46	180	211930_h_ori76

Figure 12: 相关性结果

## 7 Alpha177

$$\text{Alpha} = ((20 - \text{HIGHDAY}(\text{HIGH}, 20)) / 20) * 100 \quad (7)$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	9.99	-10.01	-0.9	-4.63	31.46	-1.11(-0.07)	12.81	0.48	-5.89	-0.43	887 X 901	5.42	14.01	-14.67	-0.0067
20110101-20111231	10.0	-10.0	-1.34	-6.85	29.19	-2.19(-0.138)	16.14	0.45	-9.39	-1.06	927 X 1196	-42.15	-39.34	28.42	-0.0127
20120101-20121231	9.99	-10.01	-1.9	-9.77	30.9	-3.62(-0.229)	19.05	0.4	-12.64	-2.04	1075 X 1285	-5.39	3.25	-14.14	-0.0182
20130101-20131231	9.98	-10.02	-2.09	-10.98	28.25	-3.44(-0.218)	20.96	0.43	-15.56	-2.15	1218 X 1227	16.72	19.03	-38.59	-0.0168
20140101-20141231	9.97	-10.04	-0.68	-3.48	26.83	-1.14(-0.072)	14.98	0.41	-5.21	-0.41	1269 X 1235	35.96	35.54	-42.65	-0.0039
20150101-20151231	9.91	-10.14	-5.01	-25.58	28.22	-2.43(-0.154)	56.63	0.45	-36.32	-2.32	1432 X 1263	37.15	46.78	-86.97	-0.0123
20160101-20161231	9.98	-10.02	-2.44	-12.48	27.62	-2.72(-0.172)	24.62	0.43	-18.07	-1.83	1350 X 1509	-25.95	-15.42	0.93	-0.0143
20170101-20171231	9.99	-10.0	-0.69	-3.56	26.56	-1.4(-0.089)	7.21	0.45	-5.36	-0.51	1430 X 1791	-21.69	0.88	14.56	-0.0078
20180101-20181231	9.99	-10.01	-2.44	-12.57	28.65	-4.41(-0.279)	24.45	0.37	-17.55	-2.92	1555 X 1952	-57.44	-38.75	32.23	-0.0199
20190101-20191231	9.98	-10.01	-3.68	-18.88	30.93	-8.1(-0.512)	36.9	0.27	-24.41	-6.33	1719 X 1890	1.43	26.71	-39.14	-0.0293
20200101-20200331	9.98	-10.01	-0.29	-6.24	27.17	-1.35(-0.086)	7.53	0.47	-9.21	-0.65	1821 X 1861	-17.35	-12.47	4.81	-0.0114
20100104-20200331	9.98	-10.02	-21.47	-10.77	28.82	-2.36(-0.149)	216.92	0.41	-14.96	-1.44	1300 X 1436	-5.94	4.85	-15.6	-0.0141

Figure 13: 回测结果

-0.7391	3.33	4.73	1.00	2.87	115	214389_pv_model_2_2_191101_08
-0.7518	3.43	6.05	2.09	2.07	134	213823_v2_191006_8
-0.7546	4.15	8.72	3.33	3.56	115	214451_pv_model_4_2_mod_191101_38
-0.858	2.19	5.58	2.47	1.17	180	211930_h_ori251

Figure 14: 相关性结果

## 8 Alpha178

$$\text{Alpha} = (\text{CLOSE} - \text{DELAY}(\text{CLOSE}, 1)) / \text{DELAY}(\text{CLOSE}, 1) * \text{VOLUME} \quad (8)$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	9.99	-10.0	-2.54	-13.14	145.2	-1.9(-0.12)	28.31	0.38	-3.62	-0.57	729 X 1030	-17.62	14.01	-8.66	-0.0122
20110101-20111231	10.0	-10.0	-2.03	-10.38	146.29	-1.84(-0.116)	30.73	0.42	-2.84	-0.49	903 X 1171	-52.41	-39.34	31.63	-0.009
20120101-20121231	9.99	-10.0	-2.38	-12.22	147.03	-2.21(-0.14)	26.98	0.42	-3.33	-0.64	963 X 1347	-21.36	3.25	-3.12	-0.0103
20130101-20131231	9.98	-10.0	-2.67	-14.03	143.9	-2.09(-0.132)	28.79	0.41	-3.91	-0.65	939 X 1417	-3.95	19.03	-24.15	-0.0102
20140101-20141231	9.98	-9.98	0.45	2.31	142.67	0.32(0.02)	15.12	0.49	0.64	0.04	900 X 1411	59.53	35.54	-54.89	-0.0018
20150101-20151231	9.96	-9.93	-2.43	-12.67	136.93	-1.49(-0.094)	36.61	0.45	-3.65	-0.45	964 X 1342	21.36	46.78	-46.5	-0.0055
20160101-20161231	9.97	-9.95	-1.84	-9.34	146.83	-1.71(-0.108)	29.37	0.41	-2.58	-0.43	1057 X 1554	-38.68	-15.42	19.75	-0.0081
20170101-20171231	9.96	-9.95	-0.91	-4.74	145.76	-0.63(-0.04)	13.69	0.46	-1.29	-0.11	1286 X 1740	-33.08	0.88	23.74	-0.0058
20180101-20181231	9.97	-9.97	-5.37	-27.75	146.57	-4.75(-0.301)	55.21	0.38	-7.57	-2.07	1534 X 1818	-107.96	-38.75	52.53	-0.0184
20190101-20191231	9.98	-9.98	-3.57	-18.45	143.37	-2.81(-0.177)	40.94	0.44	-5.12	-1.01	1519 X 2083	-38.31	26.71	1.63	-0.0104
20200101-20200331	10.0	-9.94	-0.8	-17.41	139.38	-2.56(-0.162)	11.5	0.47	-4.97	-0.9	1565 X 2114	-75.42	-12.47	41.13	-0.0083
20100104-20200331	9.98	-9.98	-24.1	-12.15	144.34	-1.82(-0.115)	245.27	0.43	-3.36	-0.53	1091 X 1506	-24.45	4.85	0.19	-0.0091

Figure 15: 回测结果

-0.5906	6.96	12.08	5.39	4.65	115	214447_pv_model_1_2_mod_191101_16
-0.6018	5.35	4.35	2.75	2.61	180	211919_my_200
-0.6048	6.55	8.72	6.48	2.2	96	215379_fac108

Figure 16: 相关性结果

## 9 Alpha179

$$\text{Alpha} = (\text{RANK}(\text{CORR}(\text{VWAP}, \text{VOLUME}, 4)) * \text{RANK}(\text{CORR}(\text{RANK}(\text{LOW}), \text{RANK}(\text{MEAN}(\text{VOLUME}, 50)), 12))) \quad (9)$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-10.0	-1.95	-10.05	71.39	-3.65(-0.231)	20.84	0.44	-5.63	-1.37	263 X 378	1.07	14.01	-21.18	-0.0163
20110101-20111231	10.0	-10.0	-1.3	-6.64	69.11	-2.59(-0.164)	14.51	0.41	-3.84	-0.8	321 X 470	-41.15	-39.34	27.86	-0.0114
20120101-20121231	10.0	-10.0	-1.78	-9.17	67.72	-4.06(-0.257)	18.06	0.41	-5.41	-1.5	505 X 741	-4.18	3.25	-14.15	-0.0166
20130101-20131231	10.0	-10.0	-1.07	-5.62	66.74	-2.85(-0.18)	10.7	0.42	-3.37	-0.83	836 X 1213	18.96	19.03	-30.21	-0.0098
20140101-20141231	10.0	-10.0	-0.88	-4.51	67.29	-2.28(-0.144)	12.08	0.43	-2.68	-0.59	768 X 1111	33.98	35.54	-43.0	-0.0085
20150101-20151231	10.0	-10.0	-1.75	-9.02	68.71	-2.05(-0.129)	18.4	0.42	-5.23	-0.74	635 X 908	60.76	46.78	-78.74	-0.0109
20160101-20161231	10.0	-10.0	-2.16	-11.04	67.95	-5.79(-0.366)	21.9	0.34	-6.5	-2.33	856 X 1247	-24.37	-15.42	2.29	-0.0198
20170101-20171231	10.0	-10.0	-1.84	-9.41	65.57	-4.45(-0.281)	18.44	0.34	-5.74	-1.69	1036 X 1528	-27.48	0.88	8.67	-0.0181
20180101-20181231	10.0	-10.0	-2.39	-12.29	64.03	-6.15(-0.389)	24.12	0.36	-7.68	-2.69	1224 X 1794	-50.54	-38.75	25.97	-0.02
20190101-20191231	10.0	-9.99	-2.66	-13.61	65.39	-7.73(-0.489)	26.6	0.33	-8.32	-3.53	1396 X 2041	6.58	26.71	-33.81	-0.0208
20200101-20200331	10.01	-9.99	-0.27	-5.85	64.24	-1.73(-0.11)	5.35	0.48	-3.62	-0.52	1451 X 2101	-17.63	-12.47	6.03	-0.0097
20100104-20200331	10.0	-10.0	-18.04	-9.06	67.32	-3.6(-0.228)	181.42	0.39	-5.38	-1.32	800 X 1166	-3.01	4.85	-15.11	-0.0151

Figure 17: 回测结果

-0.7315	4.17	9.54	4.41	2.1	134	213793_vlv2 191003_26
-0.8159	3.41	6.93	3.17	1.18	180	211930_h_ori253
-0.9066	2.79	6.1	3.44	1.1	180	211919_my_234

Figure 18: 相关性结果

## 10 Alpha180

$$\text{Alpha} = ((\text{MEAN}(\text{VOLUME}, 20) < \text{VOLUME}) ? ((-1 * \text{TSRANK}(\text{ABS}(\text{DELTA}(\text{CLOSE}, 7)), 60)) * \text{SIGN}(\text{DELTA}(\text{CLOSE}, 7)) : (-1 * \text{VOLUME}))) \quad (10)$$

dates	long(M)	short(M)	pnl(M)	%ret	%tvr	shrp (IR)	%dd	%win	bpmrgn	fitness	Coverage	%posret	%inxret	%negret	IC
20100104-20101231	10.0	-9.99	3.36	17.38	55.34	3.46(0.219)	9.64	0.63	12.56	1.94	1294 X 522	13.62	14.01	21.13	0.0105
20110101-20111231	10.0	-10.0	1.21	6.18	53.43	1.66(0.105)	6.34	0.55	4.62	0.56	1594 X 553	-33.38	-39.34	45.74	0.0051
20120101-20121231	10.0	-10.0	1.86	9.55	58.66	3.1(0.196)	5.52	0.61	6.51	1.25	1771 X 602	7.29	3.25	11.81	0.0088
20130101-20131231	10.0	-9.99	3.26	17.15	63.36	5.13(0.324)	2.65	0.65	10.83	2.67	1783 X 664	28.56	19.03	5.73	0.0116
20140101-20141231	10.0	-10.0	0.12	0.61	66.14	0.14(0.009)	16.56	0.56	0.37	0.01	1784 X 727	58.76	35.54	-57.55	0.0037
20150101-20151231	9.98	-10.0	3.7	18.86	59.35	2.46(0.155)	11.01	0.61	12.79	1.39	1921 X 784	65.12	46.78	-27.08	0.0076
20160101-20161231	9.94	-10.0	2.17	11.14	63.19	2.78(0.176)	4.86	0.61	7.06	1.17	2004 X 860	-6.31	-15.42	28.5	0.0075
20170101-20171231	9.94	-9.99	2.48	12.75	61.09	2.39(0.151)	6.86	0.57	8.36	1.09	2353 X 897	-10.31	0.88	35.71	0.0096
20180101-20181231	9.99	-10.0	2.69	13.85	62.16	3.66(0.231)	2.99	0.59	8.91	1.73	2584 X 929	-39.26	-38.75	66.91	0.0068
20190101-20191231	9.98	-9.99	2.32	11.89	64.88	3.9(0.247)	3.23	0.62	7.35	1.67	2645 X 972	22.33	26.71	1.52	0.0062
20200101-20200331	9.99	-10.0	0.12	2.65	64.65	0.77(0.048)	4.5	0.6	1.64	0.16	2706 X 982	-21.16	-12.47	26.45	0.003
20100104-20200331	9.98	-10.0	23.3	11.7	60.85	2.58(0.163)	17.73	0.6	7.7	1.13	1991 X 757	9.91	4.85	13.51	0.0076

Figure 19: 回测结果

Corr	ISSharpe	SemiOS	OSSharpe	Fitness	OSdays	ID
0.6348	4.52	4.94	2.48	7.69	180	211919_my_47
0.5895	5.4	4.91	-1.28	8.78	141	213518_h388
0.5461	2.82	3.17	nan	1.81	102	215063_qh44

Figure 20: 相关性结果