TSINGHUA PBCSF
清华五道口

研究报告

FOFs

25%

insights for the investment practice, and also contributes to the potential improvement of the evaluation system in the hedge fund industry.

2024 11 89496 5.23

11921 18.30

FOF

Bali 2006

Kosowski 2007

Hong 2017

3%

26.33% T

2.80

LL_HH [1]

12.51% T 3.32

300

25%

[1] 4.3

(2004)

Kosowski (2007)

Jagannathan 2010

Bali 2006

Bali(2013)

AFSD

Manipulation-proof Performance Measures MPPM

Goetzmann 2007

2013 6

2011 -

Hong 2017

Zhang 2022

2022

1

1 2

Fung Hsieh 2001 Jagannathan 2010 3

Backfill bias 12 Fung

Hsieh 2000 Aggarwal Jorion 2010 4

Kosowski 2007 24

[2]

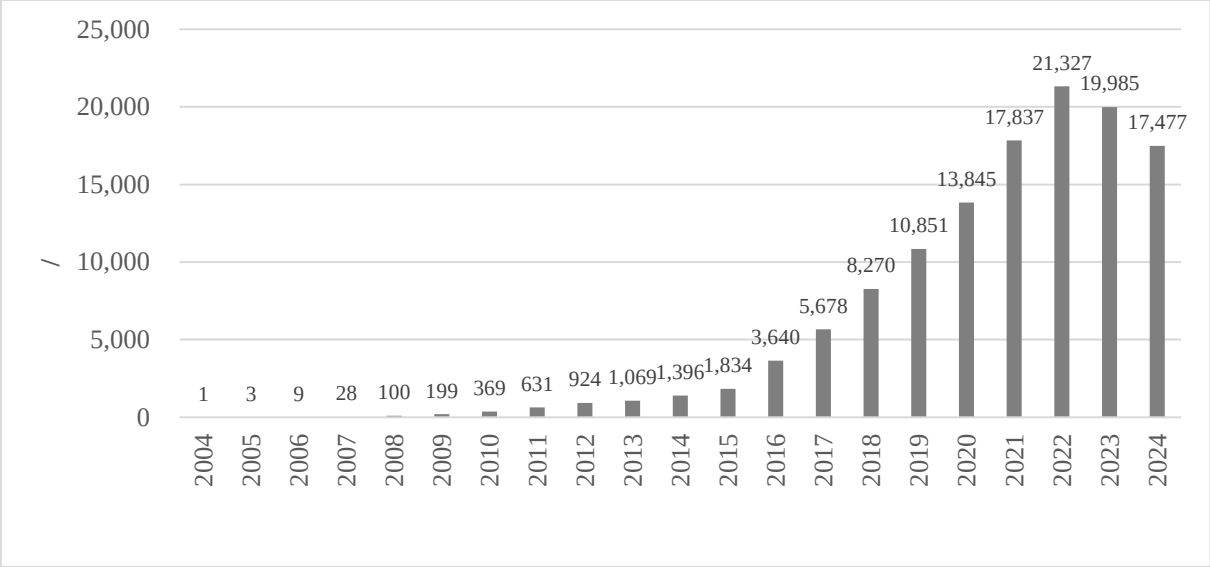
1 2006

2007 1

[2] A

2024 7 [3] [4]

[5]



1 2004 --2024

1

0.72%

0.05%

2.18%

17.81

1

3 2024 7

4

[0.1, 0.99]

5

					25%		75%	
	725161	0.13	6.80	-35.49	-3.16	-0.08	3.15	48.11
	16971	0.37	6.19	-35.36	-2.44	-0.01	2.85	56.24
	91357	0.63	6.69	-70.60	-1.56	0.09	2.22	266.11
	13722	-0.19	8.42	-51.69	-3.29	-0.22	2.40	118.44
	44011	0.26	3.00	-25.29	-0.58	0.20	1.21	30.29
	151611	0.28	2.10	-29.09	-0.15	0.26	0.58	41.12
	59266	0.04	3.66	-26.23	-1.41	0.05	1.46	29.61
	92545	0.24	5.33	-36.98	-1.76	0.10	2.08	37.77
	1194644	0.19	6.05	-70.60	-2.10	0.10	2.22	266.11

2

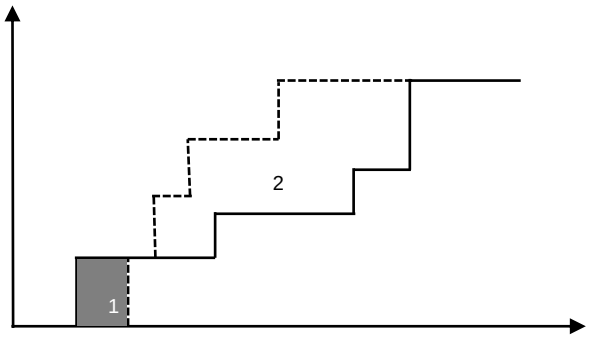
1 Manipulation-proof Performance Measures MPPM

Goetzmann 2007 MPPM

$$\equiv \frac{1}{1-\Delta} \ln\left(\frac{1}{-}\sum_{=1}\frac{1+}{1+}^{1-}\right) \qquad 1$$

Δ T=12, Δ =1/12, = 3 8

2 AFSD



2

Bali 2013 2

1

2

$$= \frac{1}{1 + 2} \qquad 2$$

H11006.CSI

MKT

AFSD 8

AFSD 16

3 CAPM ALPHA

2022 24

16

$$- = + \cdot + \qquad 3$$

CAPM

4 AV

CAPM AV

= —— 4

5 CAPM R Alpha R2A

Amihud Goyenko 2013 ^{2}

2

$$2 = \cdot 1 - ^{2} \quad 5$$

6 RET_DOWN

UP DOWN

RET_DOWN 12 UP

0 12 12

6

RET_DOWN RET_DOWN

$$\_ = \prod_{=1}^{12} 1 + {}_{,,} - 1 \qquad 6$$

1

H11006.CSI

MKT

7

8 Bayesian alpha

Kosowski 2007 Pástor Stambaugh 2002

C

3

Fung Hsieh 2004

HFF

Liu 2019

HFF

2 LSY

							/
MKTRF	0.66	7.43	0.76	0.67	7.47	0.77	1.00
SMB	0.51	4.50	0.29	0.65	4.38	0.48	0.99
VMG	1.10	3.76	1.08	1.11	3.79	1.19	0.98
PMO	0.80	3.55	0.86	0.75	3.29	0.89	0.94

BOND10

CBMB10 BOND_RET 10

AA- 10

Wind

Futures CMOM

BASIS 19

Wind

1 BOND10

$$10 = \left(\frac{10}{10_{-1}}\right) - 1 \qquad 8$$

10 10

2 CBMB10

$$10 = \frac{10 - 10}{10_{-1} - 10_{-1}} - 1 \qquad 9$$

10 10 AA-

10 10

3 BOND_RET

$$= \frac{}{_{-1}} - 1 \qquad 10$$

–

4 FUTURES

$$= \frac{}{_{-1}} - 1 \qquad 11$$

–

5 CMOM

74 *t* 12

30% 30% *t*+1

+1 +1

$$_{+1} = \quad _{+1} - \quad _{+1} \qquad 12$$

6 BASIS

74 *t*

5 5

t+1 +1

+1

+1 = +1 − +1 13

3

	N				**25%**		**75%**	
MKTRF	288	0.53	7.30	-25.51	-3.89	0.61	4.32	24.34
SMB	288	0.67	4.31	-17.08	-1.63	0.55	2.79	17.36
VMG	288	1.10	3.70	-11.05	-1.06	1.16	3.50	16.89
PMO	288	0.75	3.33	-20.35	-0.65	0.89	2.34	13.38
BOND10	204	-0.33	4.04	-16.70	-2.95	-0.55	1.72	10.89
CBMB10	275	0.18	5.88	-31.17	-2.61	-0.05	2.51	20.23
BOND_RET	275	0.09	0.58	-1.62	-0.25	0.13	0.46	2.16
FUTURES	246	0.47	4.44	-22.48	-1.92	0.20	3.52	12.53
BASIS	203	0.53	3.51	-12.44	-1.50	0.66	2.40	12.12
CMOM	281	0.79	3.62	-15.17	-1.34	0.83	2.81	14.20

HFF 3

BOND10 -0.33%

VMG 1.10%

MKTRF 7.30 BOND_RET

0.58

1.

Alpha

?

HFF

1.22%

HFF

3.00% t 2.27

5%

9.16% 3.58%

MKTRF

VMG

SMB

2.

8 MPPM AFSD RET_DOWN Relative alpha RLalpha ALPHA AV R2A Bayesian alpha Byalpha

5

HFF

P1 P5 P5-P1

HFF Alpha HFF Alpha

5

RET_DOWN HFF Alpha

5%

MPPM AFSD Byalpha

HFF Alpha 5%

RET_DOWN

AFSD RLALPHA

AFSD RET_DOWN RLalpha

AFSD RET_DOWN ALPHA AV R2A Byalpha

5

/%	MPPM			AFSD		
	P1	**P5**	**P5-P1**	**P1**	**P5**	**P5-P1**
HFF Alpha	2.25 [0.46] 1.46 [0.81]	5.14 [1.27] 7.87 [2.63]	2.89 [1.09] 6.41 [2.23]	-0.13 [-0.03] -0.11 [-0.07]	6.77 [1.28] 6.67 [2.86]	6.90 [2.61] 6.77 [2.90]
HFF Alpha	6.41 [1.22] 4.16 [1.11]	13.08 [2.36] 9.55 [2.20]	6.68 [1.15] 5.39 [0.97]	4.62 [1.24] 6.89 [1.74]	8.33 [2.08] 6.15 [1.89]	3.71 [1.18] -0.74 [-0.19]
HFF Alpha	10.37 [2.44] 10.68 [2.13]	25.88 [4.53] 25.33 [3.50]	15.51 [2.61] 14.65 [1.90]	9.35 [2.05] 8.59 [1.88]	15.22 [4.25] 13.89 [3.09]	5.86 [1.24] 5.30 [0.91]
HFF Alpha	-10.26 [-1.69] -11.38 [-2.05]	4.45 [0.89] 5.03 [1.08]	14.71 [2.46] 16.41 [2.66]	-8.76 [-1.73] -8.00 [-2.16]	2.28 [0.42] 2.45 [0.61]	11.04 [2.07] 10.45 [1.85]
HFF Alpha	2.76 [1.05] 1.20 [0.49]	6.86 [2.56] 5.58 [2.98]	4.10 [1.77] 4.38 [1.50]	-0.02 [-0.01] -0.63 [-0.53]	3.65 [1.65] 4.93 [2.72]	3.67 [1.75] 5.56 [2.83]
HFF Alpha	-0.66 [-0.33] -1.75 [-1.56]	4.09 [2.73] 2.99 [3.05]	4.75 [2.13] 4.73 [2.82]	-2.93 [-1.15] -7.31 [-2.22]	5.86 [3.92] 4.49 [4.03]	8.79 [2.81] 11.80 [2.87]
HFF Alpha	-1.40 [-0.50] -2.06 [-1.20]	3.69 [1.05] 3.26 [1.32]	5.08 [2.11] 5.32 [1.78]	-1.72 [-0.58] -1.65 [-1.28]	1.34 [0.44] 2.44 [1.10]	3.06 [1.90] 4.09 [1.75]
HFF Alpha	-2.19 [-0.71] -1.86 [-0.85]	5.80 [1.61] 5.32 [2.11]	7.99 [3.13] 7.18 [2.23]	0.48 [0.21] 0.19 [0.12]	6.79 [2.41] 6.20 [3.42]	6.31 [3.02] 6.01 [2.29]

5

/%	RET_DOWN			RLalpha		
	P1	**P5**	**P5-P1**	**P1**	**P5**	**P5-P1**
	1.83	6.26	4.43	2.73	6.79	4.06
	[0.40]	[1.51]	[2.15]	[0.56]	[1.42]	[2.93]
HFF Alpha	1.30	6.39	5.09	0.71	6.17	5.46
	[0.80]	[2.28]	[1.83]	[0.41]	[3.03]	[4.61]
	4.01	6.28	2.28	8.02	6.24	-1.78
	[0.93]	[1.59]	[0.51]	[1.21]	[1.47]	[-0.41]
HFF Alpha	4.97	4.92	-0.05	7.46	3.83	-3.63
	[1.20]	[1.46]	[-0.01]	[1.57]	[1.57]	[-0.84]
	10.74	27.95	17.21	6.44	13.83	7.39
	[2.57]	[4.19]	[2.29]	[1.60]	[3.42]	[2.35]
HFF Alpha	7.79	30.11	22.32	4.73	12.19	7.46
	[1.97]	[3.71]	[2.51]	[1.09]	[3.31]	[2.47]
	-12.23	7.02	19.25	-3.76	-3.12	0.64
	[-2.23]	[0.90]	[2.83]	[-0.70]	[-0.62]	[0.15]
HFF Alpha	-10.08	10.19	20.27	-0.24	2.41	2.65
	[-2.53]	[1.81]	[2.82]	[-0.07]	[0.63]	[0.45]
	-0.35	5.02	5.38	3.12	5.33	2.21
	[-0.16]	[2.48]	[3.93]	[0.98]	[2.75]	[1.03]
HFF Alpha	-1.28	4.06	5.35	1.46	4.56	3.11
	[-0.77]	[2.25]	[2.83]	[0.96]	[2.32]	[1.63]
	0.01	4.68	4.68	1.31	3.43	2.12
	[0.00]	[2.29]	[2.50]	[0.79]	[2.85]	[2.03]
HFF Alpha	-0.14	3.49	3.63	-0.31	2.57	2.88
	[-0.15]	[1.91]	[1.83]	[-0.50]	[3.19]	[3.50]
	0.17	3.60	3.43	3.74	5.64	1.91
	[0.05]	[1.12]	[1.39]	[1.05]	[1.51]	[1.22]
HFF Alpha	0.96	2.82	1.86	1.56	3.92	2.36
	[0.76]	[1.43]	[1.03]	[0.77]	[2.61]	[1.69]
	-0.68	5.44	6.12	2.87	6.34	3.47
	[-0.16]	[2.35]	[2.18]	[0.61]	[1.63]	[2.35]
HFF Alpha	0.59	5.51	4.93	1.72	4.99	3.27
	[0.34]	[3.92]	[2.73]	[0.92]	[3.28]	[2.14]

5

/%	ALPHA			AV		
	P1	**P5**	**P5-P1**	**P1**	**P5**	**P5-P1**
	-0.18	6.49	6.67	-0.40	7.17	7.57
	[-0.04]	[1.37]	[2.46]	[-0.09]	[1.59]	[2.77]
HFF Alpha	-1.24	7.86	9.10	-1.69	7.00	8.70
	[-0.68]	[3.16]	[3.52]	[-1.07]	[3.14]	[3.78]
	3.69	6.09	2.40	5.18	3.22	-1.96
	[0.72]	[1.60]	[0.51]	[1.12]	[1.04]	[-0.45]
HFF Alpha	3.85	4.57	0.72	4.41	1.05	-3.35
	[0.64]	[1.84]	[0.12]	[0.90]	[0.45]	[-0.63]
	6.89	29.34	22.45	6.46	23.62	17.15
	[1.37]	[4.52]	[3.46]	[1.34]	[4.57]	[2.78]
HFF Alpha	6.33	30.33	24.00	6.28	26.95	20.67
	[1.11]	[3.69]	[2.95]	[1.11]	[3.90]	[2.72]
	-9.89	3.27	13.16	-7.93	3.62	11.56
	[-1.68]	[0.59]	[2.19]	[-2.12]	[0.76]	[2.26]
HFF Alpha	-7.42	8.15	15.57	-5.63	7.79	13.41
	[-2.07]	[1.68]	[2.31]	[-1.78]	[1.97]	[2.43]
	-0.00	7.28	7.28	1.74	6.04	4.30
	[-0.00]	[3.30]	[3.60]	[0.58]	[4.59]	[1.67]
HFF Alpha	-2.70	7.67	10.36	-2.69	5.82	8.51
	[-1.17]	[4.43]	[4.39]	[-1.14]	[4.77]	[3.29]

5

/%	R2A			Byalpha		
	P1	**P5**	**P5-P1**	**P1**	**P5**	**P5-P1**
	-0.98	5.58	6.56	2.67	6.94	4.26
	[-0.20]	[1.22]	[2.38]	[0.62]	[1.49]	[2.15]
HFF Alpha	-1.19	7.18	8.37	-0.35	7.28	7.62
	[-0.67]	[2.68]	[3.10]	[-0.23]	[2.75]	[2.73]
	1.70	6.07	4.38	-0.04	8.49	8.53
	[0.38]	[1.62]	[1.08]	[-0.01]	[1.70]	[2.38]
HFF Alpha	-1.55	4.29	5.84	3.23	5.27	2.03
	[-0.39]	[1.62]	[1.47]	[0.67]	[1.61]	[0.44]
	6.66	29.13	22.47	4.39	20.82	16.43
	[1.39]	[4.64]	[3.63]	[0.84]	[3.66]	[2.49]
HFF Alpha	6.53	30.22	23.68	4.32	17.88	13.56
	[1.15]	[3.73]	[3.02]	[0.69]	[2.74]	[1.70]
	-12.83	4.46	17.29	-9.97	0.33	10.30
	[-2.37]	[0.81]	[3.19]	[-2.22]	[0.06]	[2.00]
HFF Alpha	-9.16	10.19	19.34	-6.13	9.82	15.95
	[-2.54]	[2.10]	[2.74]	[-1.85]	[2.20]	[2.65]
	0.46	5.94	5.48	-2.41	4.11	6.53
	[0.19]	[3.04]	[2.63]	[-1.30]	[2.12]	[3.84]
HFF Alpha	-2.52	6.08	8.60	-3.50	5.03	8.53
	[-1.07]	[3.69]	[3.50]	[-2.45]	[3.30]	[4.19]
	-1.56	4.37	5.93	-1.36	5.45	6.81
	[-0.98]	[4.18]	[4.06]	[-1.16]	[3.40]	[6.51]
HFF Alpha	-1.45	4.15	5.60	-1.76	3.41	5.17
	[-1.34]	[3.61]	[4.93]	[-3.00]	[3.26]	[4.33]
	-0.87	1.80	2.67	-0.35	2.87	3.22
	[-0.27]	[0.64]	[1.67]	[-0.11]	[1.08]	[2.18]
HFF Alpha	-1.81	0.90	2.72	-2.58	1.95	4.53
	[-1.19]	[0.53]	[1.64]	[-1.76]	[1.26]	[2.93]
	-1.29	5.73	7.02	1.28	7.82	6.54
	[-0.41]	[1.78]	[5.45]	[0.31]	[1.86]	[5.26]
HFF Alpha	-1.43	5.02	6.45	-0.02	6.45	6.47
	[-1.14]	[3.50]	[4.36]	[-0.02]	[3.64]	[4.22]

Newey-West(1987) t

3.

Z-SCORE

Performance Indicator PI

PI MPPM AFSD

RET_DOWN RLalpha ALPHA AV R2A Byalpha

PI

PI 5

HFF

6				PI			
	/%	P1	P2	P3	P4	P5	P5-P1
		-0.45	3.31	4.31	4.75	6.80	7.25
		[-0.09]	[0.72]	[0.92]	[0.96]	[1.52]	[2.70]
	HFF Alpha	-1.12	0.95	3.50	4.49	8.23	9.35
		[-0.74]	[0.69]	[1.97]	[2.09]	[3.23]	[3.68]
		5.34	3.77	7.91	13.22	6.72	1.38
		[1.01]	[0.89]	[1.14]	[1.99]	[1.96]	[0.30]
	HFF Alpha	1.42	2.88	5.58	11.96	3.46	2.04
		[0.33]	[0.94]	[1.31]	[2.00]	[1.38]	[0.45]
		3.24	8.07	16.36	21.86	31.13	27.89
		[0.74]	[1.55]	[3.09]	[3.52]	[4.41]	[3.45]
	HFF Alpha	3.13	7.49	16.94	24.28	29.46	26.33
		[0.60]	[1.35]				

26.33%

PI

LL_HH

PI 5

G1 G5

G1 G5 PI 5 G1

Low

G5 High

Low High 7

High-Low 12.51% 1%

T 3.32 LL_HH

High 6 14.33%

T

8		=5					
	/%			/		( )	
		1/1	1/3	1/12	3/3	3/12	12/24
		23.60	20.62	16.95	22.72	17.48	6.35
		0.31	0.27	0.24	0.29	0.25	0.10
	Alpha	23.21	19.26	16.35	23.32	17.06	6.92
	T	[3.81]	[3.53]	[3.21]	[4.16]	[3.30]	[1.38]
		14.67	14.24	12.71	13.66	12.45	11.81
		0.24	0.25	0.25	0.23	0.24	0.21
	Alpha	9.77	9.72	11.10	10.37	12.08	12.48
	T	[1.95]	[2.07]	[3.02]	[2.05]	[3.16]	[2.57]

2708 r[( ) TJETQEMC q261.89 10545.83 44.64 18.12 reW*n /P2708 r[( ) TJETQEMDC q352.63 563.95 44.

5

10 20 B.2 B.3 B.4 8

4

/ HFF

1%

4.4

6 PI

P5-P1 HFF Alpha PI

/ 1/1 HFF Alpha

5% 9 LL_HH

B.2

B.3 B.4 10 20 PI

5

9 LL_HH

	/%	1/1	1/3	1/12	3/3	3/12	12/24
5	Excess Return	25.05	23.90	18.91	23.13	20.56	12.14
	Sharp Ratio	0.35	0.36	0.33	0.32	0.33	0.24
	Alpha	20.71	21.56	18.42	21.00	18.55	10.86
	T-Stat	[3.80]	[4.26]	[3.93]	[3.96]	[3.74]	[2.56]

Newey-West(1987) t

4.

2017 2020 2023

ID

[9] 6

2021

300 3 4

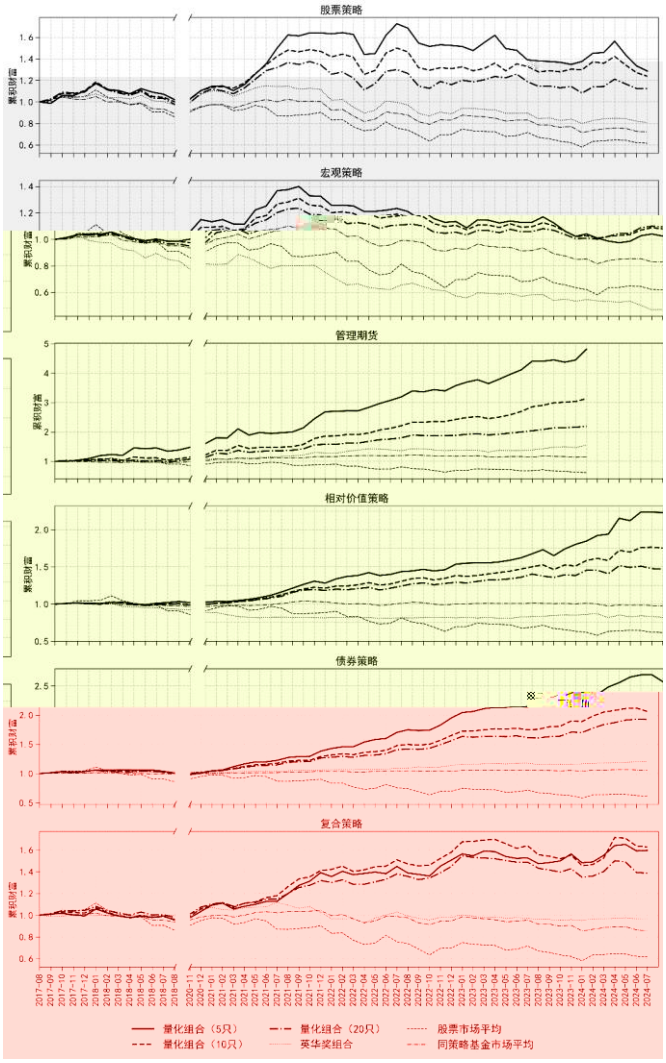
[10]

2017 2020

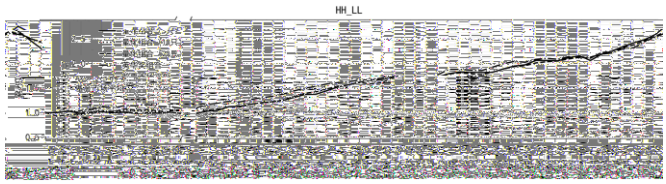
2022 2018 9 2020 10

[9] B.1 2023 6

2023 6
5 6
[10] 2023 11 2023-12-05
B.1



3



4

10 HFF

Alpha t

-

HFF Alpha

300

- HFF Alpha

5%

10

HFF Alpha

5

38.84% T 3.17

11 LL_HH

300 5% T 2.33

11

25%

10

/%				5	10	20	-	-	- 5	- 10	- 20
	-3.85	-9.20	-6.43	7.00	5.86	3.68	5.35	2.58	-10.85	-9.72	-7.54
	-0.09	-0.16	-0.15	0.12	0.11	0.07	0.08	0.07	-0.20	-0.20	-0.16
	6.16	-3.85	2.39	20.86	20.23	19.70	10.01	3.77	-14.70	-14.07	-13.54
	[1.79]	[-2.33]	[1.24]	[2.46]	[3.03]	[4.27]	[2.56]	[2.02]	[-1.99]	[-2.80]	[-3.59]
	-15.58	-9.20	-3.74	1.18	2.10	2.35	-6.37	-11.84	-16.75	-17.67	-17.93
	-0.35	-0.16	-0.13	0.03	0.06	0.08	-0.18	-0.22	-0.38	-0.41	-0.43
	-13.47	-3.85	-1.68	-0.64	-0.38	0.93	-9.61	-11.78	-12.83	-13.08	-14.39
	[-2.49]	[-2.33]	[-0.76]	[-0.11]	[-0.09]	[0.27]	[-1.78]	[-2.19]	[-1.65]	[-1.87]	[-2.26]

11 LL_HH

/% 5 10

FOF

300

25%

5 5

B

B.1

	20 2 4 2 4 1
1	30 1 4 1 5 3
	34 3 3 2 3 1

B.2 **=10**

		/		( )		
/%	**1/1**	**1/3**	**1/12**	**3/3**	**3/12**	**12/24**
	20.45	16.54	13.67	16.99	13.67	8.37
	0.28	0.24	0.21	0.24	0.21	0.14
Alpha	23.29	16.92	13.02	15.98	12.73	8.41
T	[4.64]	[3.69]	[3.03]	[3.09]	[2.83]	[2.09]
	13.52	13.89	12.30	12.24	12.02	11.86
	0.24	0.26	0.26	0.22	0.25	0.23
Alpha	8.41	9.75	10.77	7.77	10.26	12.14
T	[1.77]	[2.22]	[3.01]	[1.71]	[2.81]	[2.52]
	40.03	35.17	29.99	32.70	29.01	29.65
	0.51	0.48	0.38	0.42	0.37	0.35
Alpha	42.84	38.08	33.81	36.65	33.51	30.07
T	[5.72]	[5.58]	[5.77]	[5.09]	[5.92]	[4.56]
	10.16	11.03	4.45	8.90	2.85	5.72
	0.11	0.12	0.06	0.10	0.04	0.07
Alpha						

B.3 **=20**

	/			( )		
/%	**1/1**	**1/3**	**1/12**	**3/3**	**3/12**	**12/24**
	14.78	13.20	10.70	14.54	11.20	6.80
	0.22	0.20	0.17	0.22	0.18	0.12
Alpha	16.50	14.13	10.31	15.81	11.17	7.91
T	[3.73]	[3.63]	[2.99]	[3.66]	[3.19]	[2.50]
	13.34	13.23	11.49	12.83	11.86	12.46
	0.25	0.25	0.25	0.24	0.26	0.25
Alpha	9.10	9.93	10.43	8.97	10.65	12.71
T	[2.00]	[2.34]	[2.94]	[2.04]	[2.92]	[2.65]
	28.61	27.63	24.84	27.81	24.56	22.80
	0.45	0.47	0.39	0.44	0.39	0.35
Alpha	29.71	28.74	26.00	28.75	25.88	23.18
T	[5.26]	[5.71]	[5.23]	[5.05]	[5.21]	[4.58]
	5.23	6.32	2.85	5.00	1.39	2.17
	0.07	0.09	0.04	0.07	0.02	0.03
Alpha	4.93	5.49	1.88	3.64	0.41	-0.04
T	[1.13]	[1.28]	[0.49]	[0.91]	[0.11]	[-0.01]
	10.49	9.08	7.29	8.92	7.12	7.09
	0.42	0.40	0.35	0.37	0.33	0.36
Alpha	8.92	7.73	6.27	7.56	6.31	6.49
T	[4.93]	[4.62]	[4.16]	[4.28]	[4.16]	[4.07]
	8.94	7.93	5.83	7.89	5.97	4.76
	0.37	0.34	0.29	0.34	0.30	0.24
Alpha	7.80	6.64	4.97	6.26	5.04	4.44
T	[4.26]	[3.78]	[3.35]	[3.59]	[3.32]	[3.27]
	4.38	4.80	4.31	4.62	4.39	1.99
	0.10	0.11	0.10	0.11	0.10	0.05
Alpha	2.21	2.41	2.42	2.29	2.39	1.18
T	[1.15]	[1.30]	[1.42]	[1.28]	[1.45]	[0.71]
	11.66	10.15	8.13	10.94	8.56	6.89
	0.25	0.23	0.19	0.24	0.20	0.16
Alpha	9.48	7.50	5.11	7.48	5.09	3.65
T	[3.75]	[2.99]	[2.79]	[3.10]	[2.82]	[2.28]

Newey-West(1987) t

B.4 LL_HH

		1/1	1/3	1/12	3/3	3/12	12/24
	/%						
10	Excess Return	23.40	21.45	17.81	20.18	18.12	9.78
	Sharp Ratio	0.40	0.36	0.33	0.33	0.32	0.21
	Alpha	22.16	19.06	17.04	17.04	16.37	6.82
	T-Stat	[4.95]	[4.37]	[3.90]	[3.84]	[3.57]	[1.87]
20	Excess Return	19.30	18.48	15.11	18.73	15.71	10.74
	Sharp Ratio	0.36	0.35	0.31	0.35	0.30	0.24
	Alpha	19.48	17.39	15.20	17.57	14.78	9.72
	T-Stat	[5.08]	[4.85]	[4.34]	[4.89]	[4.16]	[2.98]

Newey-West(1987) t

C

Bayesian Alpha

$$, = + ′ , + , \quad \text{C.1}$$

$$, = + ′ , + ′ , + , \quad \text{C.2}$$

$$, = + ′ + ′ + ′ , + ′ , + , \quad \text{C.3}$$

$$= + ′ \quad \text{C.4}$$

$$′ = ′ + ′ \quad \text{C.5}$$

$$, = (′ ,) + , \quad \text{C.6}$$

OLS

$$\hat{} = \hat{} + \tilde{}′ \hat{} \quad \text{C.7}$$

MKTRF

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,

k benchmark m nonbenchmark

$$|\Sigma\sim \quad 0, \ ^2 \ (\frac{1}{2}\Sigma) \quad \text{C.8}$$

= 0 = 0

= ∞

$$|\sigma_u^2 \sim \quad 0, \frac{2}{2} \sigma_\delta^2 \qquad C.9$$

$$|\sigma_u^2 \sim \quad 0, \frac{2}{2} \Phi_c \qquad C.10$$

σ_δ^2 Φ_c

$\sigma_\delta^2 = \infty$ 0

0 ^ Φ_c

^ ^

= , ~ 0, Σ , =

$$\Sigma^{-1} \sim \quad ^{-1}, \qquad \text{C.12}$$

= ^{2} − − 1 , ^{2} OLS Σ

+ 1 × + 1 (1,1) $^2/\ ^2$

= + ′ = ′ − $^{-1}$ ′

$$\tilde{} = \ | \ = \quad ^{-1} \ ' \quad ' \qquad \text{C.13}$$

$$\tilde{\Sigma} = \ \Sigma| \ = \frac{1}{+ \ - \ - \ - 1} \ + \ \hat{\Sigma} + \hat{} \ ' \ \hat{} \qquad \text{C.14}$$

$$| \ = \tilde{\Sigma} \quad ^{-1} \qquad \text{C.15}$$

Σ^{-1} Wishart = + 3

$\tilde{} = \hat{} = \ '1 \ / \ , \hat{} = \ - 1 \hat{} \ ' \ ' \ - 1 \hat{} \ ' \ / \ , \tilde{} =$

$\frac{\hat{}}{- \ -2}$

, , S

= 1 ,

$$^2 \sim \frac{^2_{0 \ 0}}{^2_0} \qquad \text{C.16}$$

$$^{2} = \frac{^{0}\ ^{2}_{0}}{_{0} - 2} \qquad \text{C.17}$$

$$_{0} = 4 + \frac{2(\quad ^{2})^{2}}{^{2}} \qquad \text{C.18}$$

C.17 C.18 ^ 2

2 2 0 C.18

(C.17) 0

$$= \quad ' \qquad \text{C. 21}$$

$$\tilde{} = [\tilde{} \ ], \quad = [0 \qquad 0] \qquad \begin{matrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{matrix} \qquad \text{C. 22}$$

$$| \quad = \quad ' | \ , \ | \quad + \quad ' | \ , \ | \qquad \text{C. 23}$$

$$' | \ , \ | \quad = \quad (\quad) + \tilde{}' \quad \tilde{} \qquad \text{C. 24}$$

$$' | \ , \ | \quad = \tilde{}' \quad \tilde{} \qquad \text{C. 25}$$

Bayesian t $\tilde{}$ / $\sqrt{\quad\quad\quad\quad|}$

余剑峰教授是清华大学五道口金融学院建树金融学讲席教授、香港科技大学商学院访问教授、清华大学金融科技研究院副院长、清华大学五道口金融学院资产管理研究中心主任、清华大学五道口金融学院全球母基金研究中心主任。文柱柱为东南大学经济管理学院副研究员。闫鹏博为香港中文大学（深圳）经管学院博士研究生。