Connected Stocks: Evidence from Tehran Stock Exchange

S.M. Aghajanzadeh M. Heidari M. Mohseni

Tehran Institute for Advanced Studies

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Motivation

Research Question

- **Can common ownership cause stock return comovement** ?
  - We connect stocks through common ownership by blockholders (ownership $> 1\%$)
  - We focus on excess return comovement for a pair of stocks
  - We use common ownership to forecast cross-sectional variation in the realized correlation of four-factor + industry residuals

Why does it matter?

- Covariance
  - Covariance is a key component of risk in many financial applications.
    (Portfolio selection, Risk management, Hedging and Asset pricing)
  - Covariance is a significant input in risk measurement models
    (Such as Value-at-Risk)
- Return predictability
  - If it's valid, we can build a profitable buy-sell strategy

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Main

- ## Common-ownership comovement efect

  [Antón and Polk (2014)]
  Stocks sharing many common investors tend to comove more strongly with each other in the future than otherwise similar stocks.

- ## Common-ownership liquidity demand

  [Koch et al (2016) ,Pastor and Stambaugh (2003), Acharya and Pedersen (2005)]
  Commonality in stock liquidity is likely driven by correlated trading among a given stock's investors. Commonality in liquidity is important because it can influence expected returns

- ## Trading needs and comovement

  [Greenwood and Thesmar (2011)]
  If the investors of mutual funds have correlated trading needs, the stocks that are held by mutual funds can comove even without any portfolio overlap of the funds themselves

- ## Stock price synchronicity and poor corporate governance

  [Boubaker et al. (2014),Khanna,Thomas (2009),Morck et al. (2000)]
  Stock price synchronicity has been attributed to poor corporate governance and a lack of firm-level transparency. On the other hand, better law protection encourages informed trading, which facilitates the incorporation of firm-specific information into stock prices, leading to lower synchronicity

Papers' Detail

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Measuring Common Ownership

Sum

$$FCAP_{ij,t} = \frac{\sum_{f=1}^{F}(S_{i,t}^{f}P_{i,t} + S_{j,t}^{f}P_{j,t})}{S_{i,t}Pi,t + S_{j,t}Pj,t}$$

SQRT

$$[\frac{\sum_{f=1}^{F}(\sqrt{S_{i,t}^{f}P_{i,t}} + \sqrt{S_{j,t}^{f}P_{j,t}})}{\sqrt{S_{i,t}Pi,t} + \sqrt{S_{j,t}Pj,t}}]^2$$

Quadratic

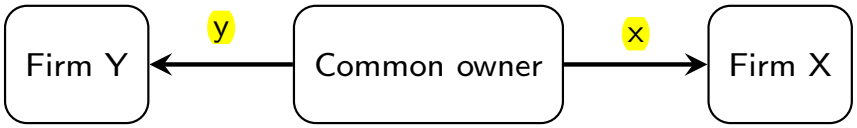
$$[\frac{\sum_{f=1}^{F}[(S_{i,t}^{f}P_{i,t})^2 + (S_{j,t}^{f}P_{j,t})^2]}{(S_{i,t}Pi,t)^2 + (S_{j,t}Pj,t)^2}]^{-1}$$

Intuition

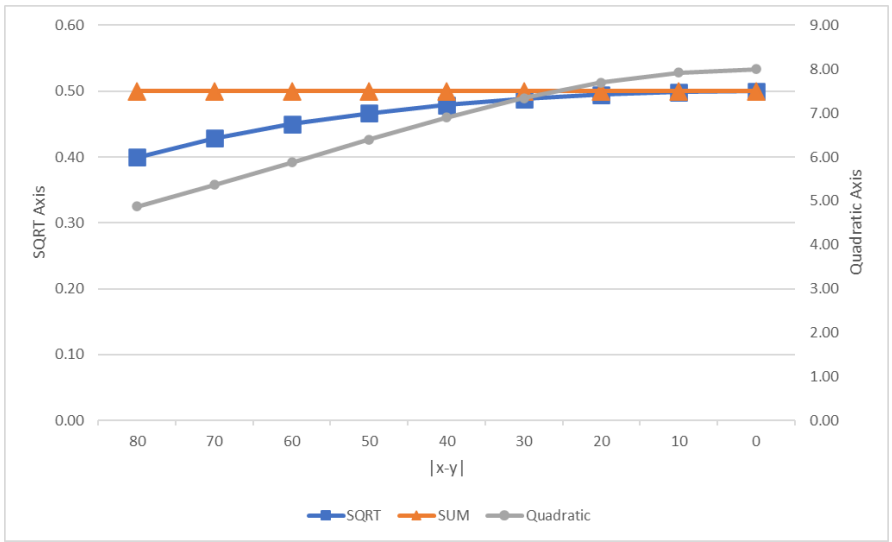
If two stocks in a pair have n mutual owner, with equal shares of the whole market cap, the mentioned indexes equal n. Proof

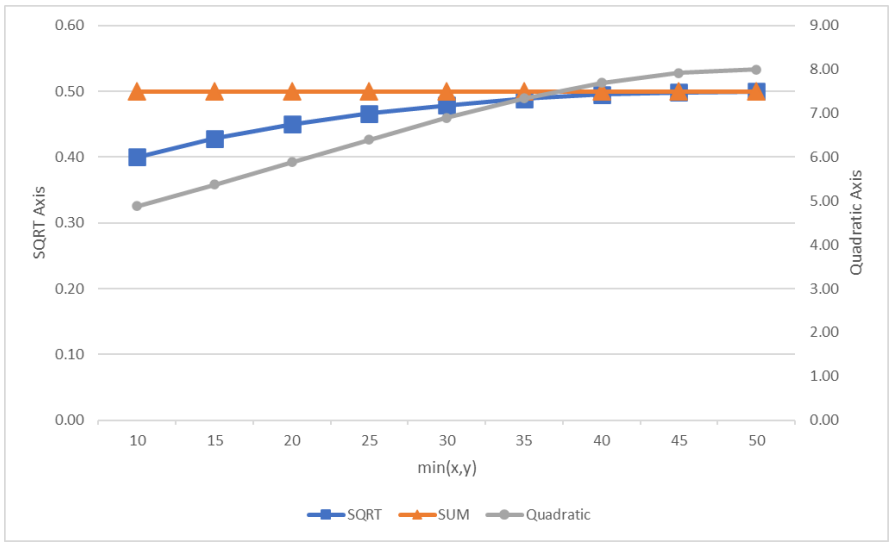
Measuring Common Ownership

Comparison



$$x + y = 100$$

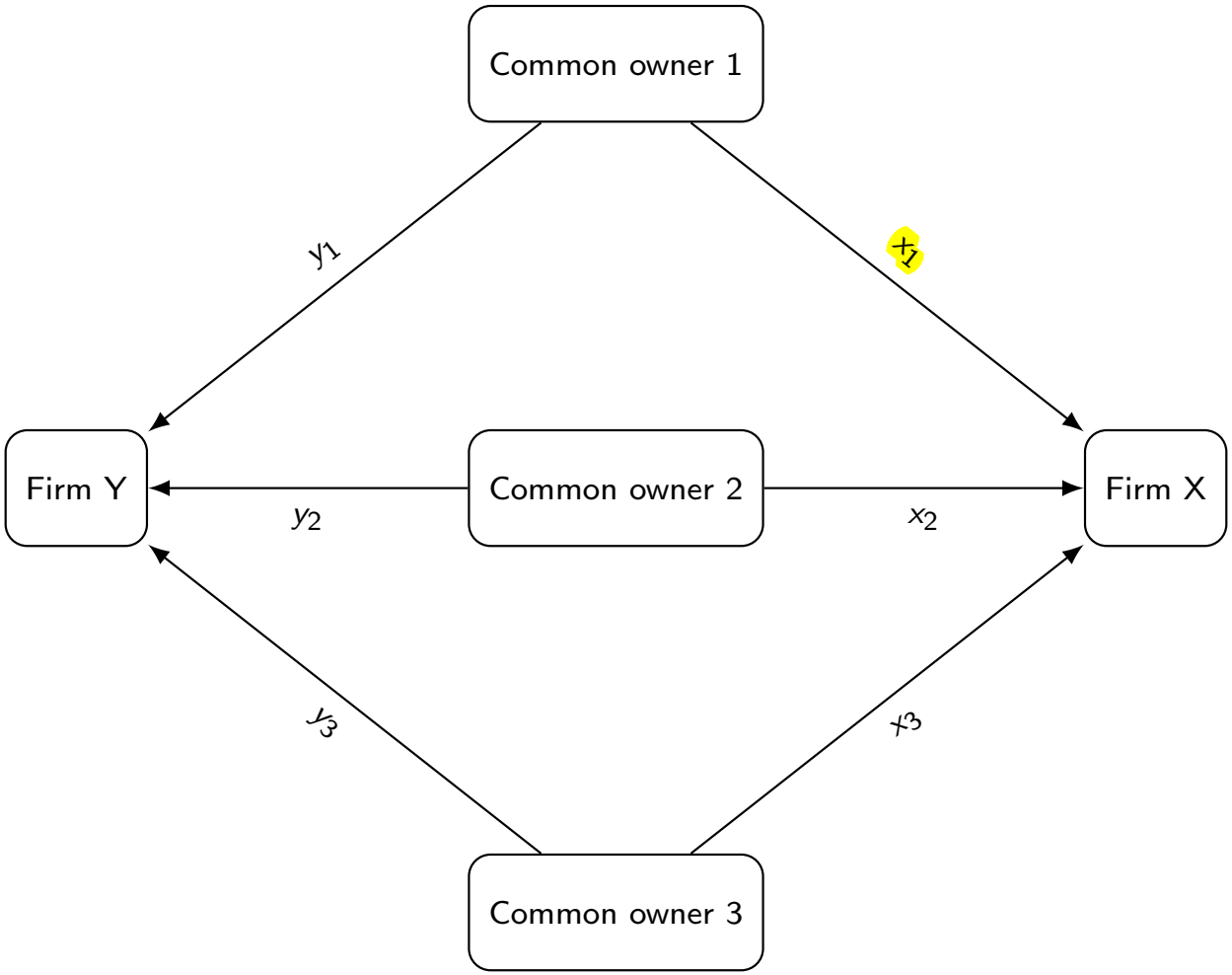




Comparison of three methods for calculating common ownership

Measuring Common Ownership

Example of three common owner



Measuring Common Ownership

Example of three common owner

Ownership	Type I	Type II	Type III	Type IV	Type V	Type VI	Type VII
x_1	1/3	10	20	5	10	20	1
y_1	1/3	10	10	5	10	20	1
x_2	1/3	80	10	5	10	20	1
y_2	1/3	80	20	5	10	20	1
x_3	1/3	10	70	5	10	20	1
y_3	1/3	10	70	5	10	20	1
SQRT	3	2.33	2.56	0.45	0.9	1.8	0.09
SUM	1	1	1	0.15	0.3	0.6	0.03
Quadratic	3	1.52	1.85	133.33	33.33	8.33	3333.33

Conclusion

We use the SQRT formula because it has an acceptable variation and has fair values at lower level of common ownership.

Data Summary

- We use blockholders' data from 2015/03/25 to 2020/11/16
  - Include of 1362 Day, 153 Fortnight and 69 Month
  - Consists of 605 firm inculding 340 firm with common owners

Year	2015	2016	2017	2018	2019	2020	Mean
No. of Firms	351	378	504	530	567	590	487
No. of Holders	719	870	1222	1305	1354	1347	1136
Av. Owners' Percent	20.93	21.54	20.47	23.14	25.61	25.17	22.81
Median of Owners' Percent	7.66	6.95	6.89	7.22	9.31	9.51	7.92
Av. Number of Owners	5	5	5	5	5	4	5
Max. Number of Owners	20	22	29	28	24	24	25
Av. Ins. Ownership	71.99	71.67	68.63	78.12	78.48	69.24	73.02
No. of Groups	42	43	47	48	48	48	46
No. of Firms not in Groups	109	120	183	181	216	240	175
No. of Firms in Groups	242	265	329	349	351	350	314
Avg. Number of Members	6	6	7	7	7	7	7
Max. Number of Members	24	25	27	29	29	29	27

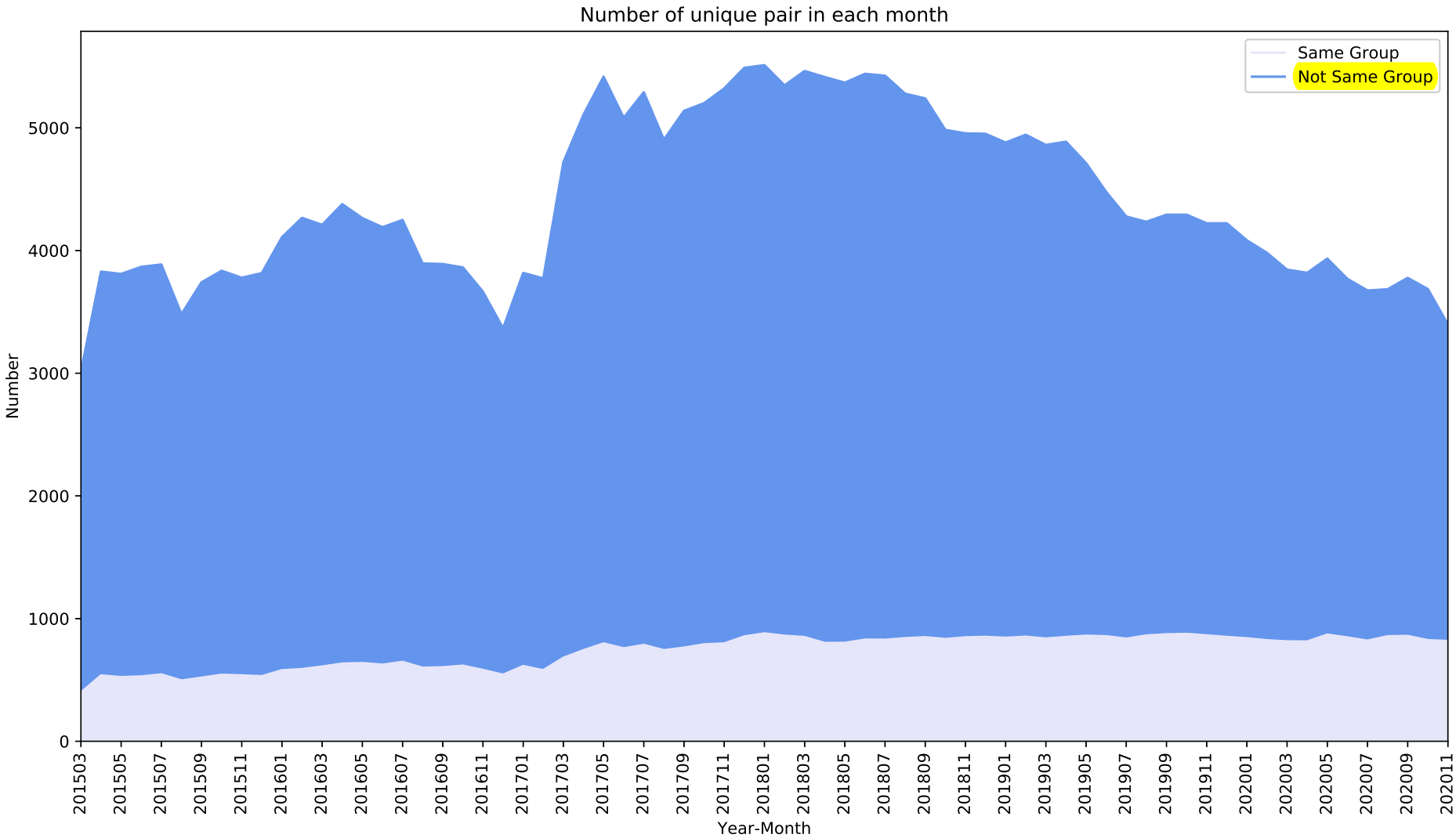
Pair Composition

- Pairs consist of two firms with at least one common owner
  - 10310 unique pairs which is 18% of possible pairs ($\frac{340*399}{2} = 67830$)

Number of unique paris

Frequency	mean	min	median	max
Fortnightly	4161	2626	4101	5397
Monthly	4397	3010	4247	5485

Year	2015	2016	2017	2018	2019	2020	Mean
No. of Pairs	4259	5307	6297	6800	6197	4877	5623
Median of Owners' Percent	10.44	10.53	10.71	10.48	10.42	11	11
Av. Number of Owners	6	6	6	6	6	6	6
Max. Number of Owners	8	8	8	8	8	8	8
Av. Ins. Ownership	80.99	81.94	82.36	83.26	83.7	83.62	83
No. of Pairs not in Groups	0	0	0	0	0	0	0
No. of Pairs not in one Group	3668	4689	5524	5804	5220	3931	4806
No. of Pairs in one Group	591	697	930	999	977	946	857
Avg. Number of Pairs in one Group	21	21	23	23	23	23	22
Max. Number of Pairs in one Group	107	116	121	130	124	115	119


Number of unique pair in each month
Same Group
Not Same Group
Number
0
1000
2000
3000
4000
5000
Year-Month
201503
201505
201507
201509
201511
201601
201603
201605
201607
201609
201611
201701
201703
201705
201707
201709
201711
201801
201803
201805
201807
201809
201811
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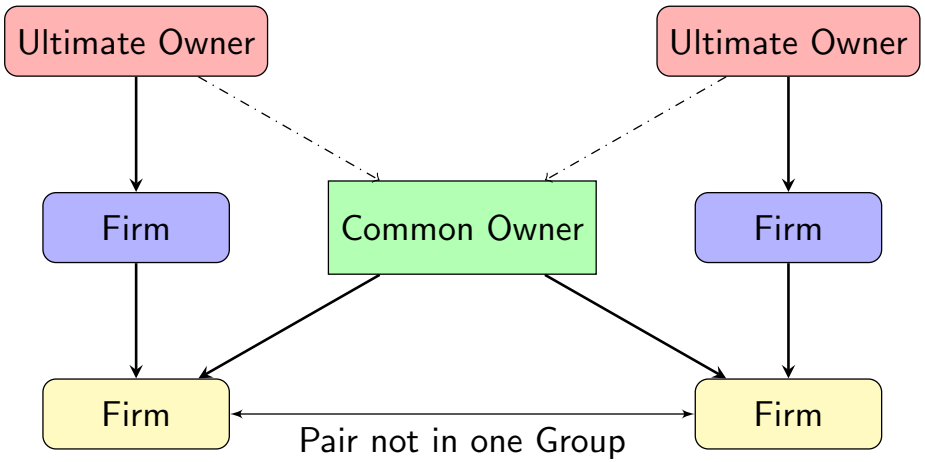
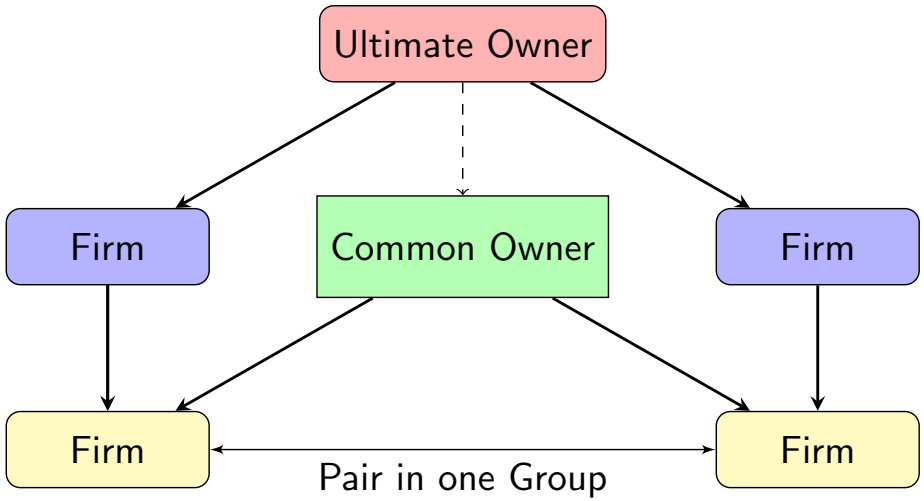
201903
201905
201907
201909
201911
202001
202003
202005
202007
202009
202011

Business Group





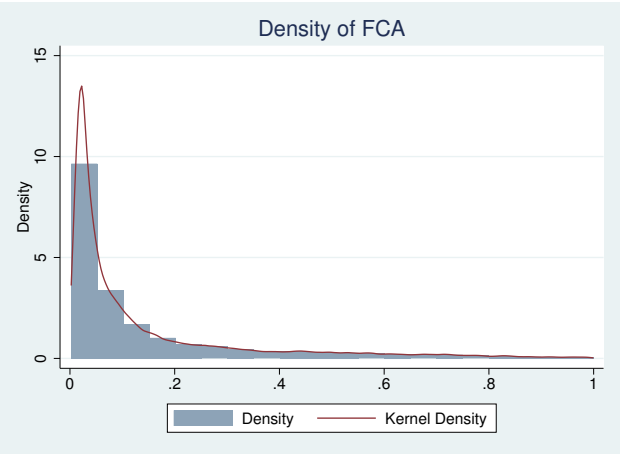
FCA vs. FCAP Summary

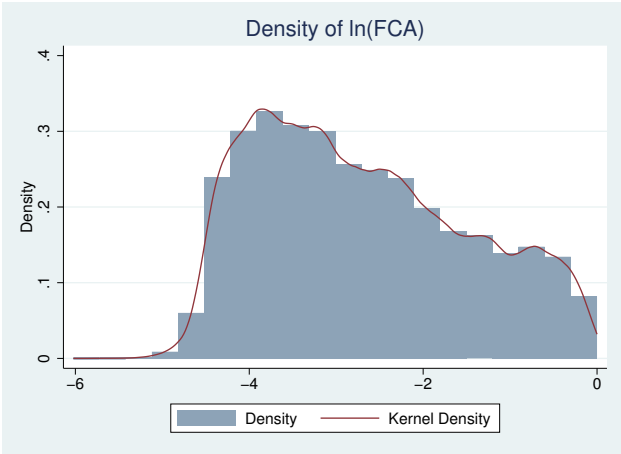
Monthly

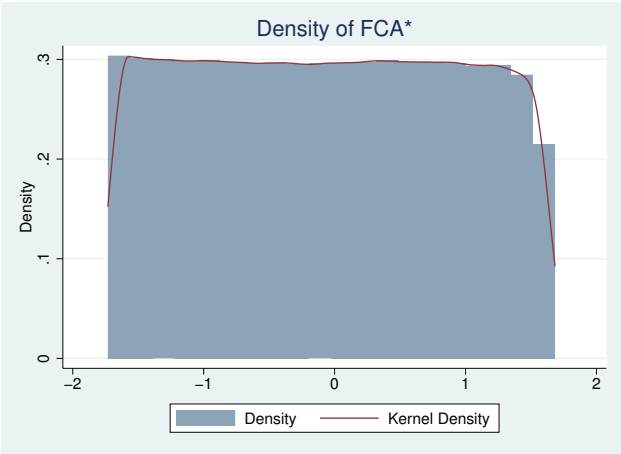
	variable	count	mean	std	min	median	max
Total	FCA	303419	0.168	0.269	0.002	0.059	4.342
	FCAP	303419	0.142	0.190	0.002	0.054	0.999
Same Group	FCA	50808	0.486	0.417	0.003	0.432	4.342
	FCAP	50808	0.391	0.259	0.004	0.400	0.999
Not Same Group	FCA	253163	0.104	0.165	0.002	0.045	2.813
	FCAP	253163	0.091	0.122	0.002	0.043	0.999
Same Industry	FCA	46797	0.379	0.419	0.007	0.243	4.342
	FCAP	46797	0.292	0.259	0.006	0.208	0.999
Not Same Industry	FCA	257174	0.129	0.210	0.002	0.049	2.869
	FCAP	257174	0.114	0.160	0.002	0.046	0.999

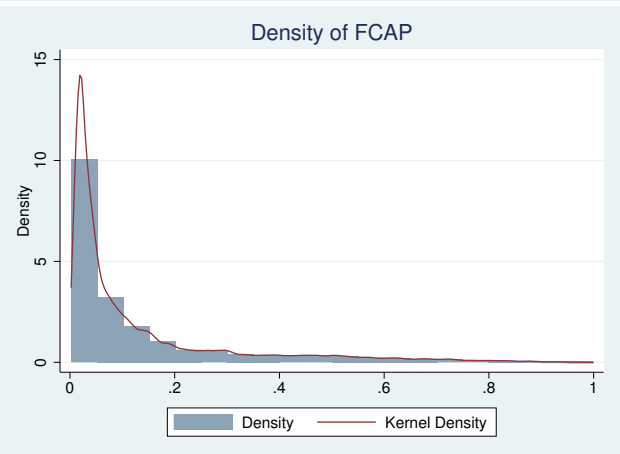
FCA vs. FCAP Distributions

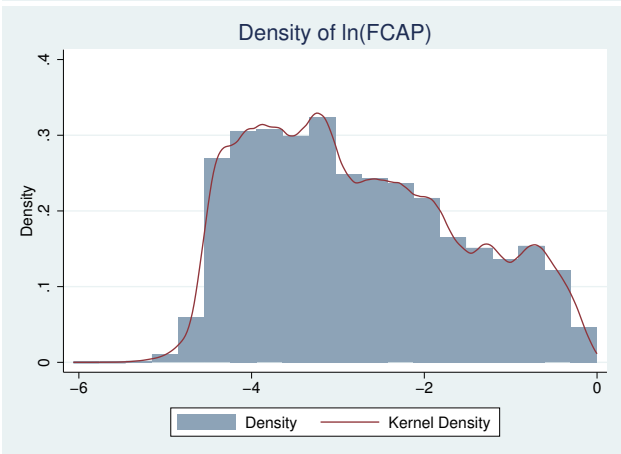
Monthly

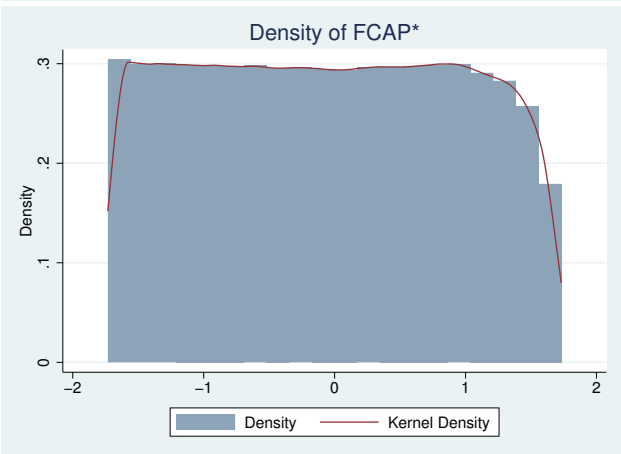












Fortnightly

Correlation Calculation

4 Factor + Industry

- Calculate correlation of returns' residuals from the model for each firm:
  - CAPM + Industry (2 Factor):

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_{mkt,i}(R_{M,t} - R_{F,t}) + \beta_{Ind,i}(R_{Ind,t} - R_{F,t}) + \boxed{\varepsilon_{i,t}}$$

  - 4 Factor :

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_{mkt,i}(R_{M,t} - R_{F,t}) + \beta_{HML,i}HML_t + \beta_{SMB,i}SMB_t + \beta_{UMD,i}UMD_t + \boxed{\varepsilon_{i,t}}$$

  - 4 Factor + Industry (5 Factor) :

$$R_{i,t} - R_{F,t} = \alpha_i + \beta_{mkt,i}(R_{M,t} - R_{F,t}) + \beta_{Ind,i}(R_{Ind,t} - R_{F,t}) + \beta_{HML,i}HML_t + \beta_{SMB,i}SMB_t + \beta_{UMD,i}UMD_t + \boxed{\varepsilon_{i,t}}$$

Correlation Calculation Results

Factors	count	mean	std	min	max
SMB	1374	0.19	1.47	-5.64	19.52
HML	1374	-0.12	1.39	-4.90	23.20
Winner − Loser	1374	0.69	1.06	-2.61	8.58
Market	1374	0.24	1.23	-4.71	4.89

$\rho_{ij,t}$	count	mean	std	min	25%	50%	75%	max
Monthly5	292895	0.015	0.326	-1	-0.19	0.01	0.22	1
Monthly2	292895	0.016	0.327	-1	-0.19	0.01	0.22	1
Monthly4	292895	0.057	0.345	-1	-0.17	0.05	0.28	1

Conclusion

We use the 4 Factor + Industry model to control for exposure to systematic risk because it almost captures all correlations between two firms in each pair.

Controls

- ρ_t : Current period correlation
- **ActiveHolder** : Dummy variable for whether at least one holder is Active. (the active holder is the one whose average percentage change is greater than median)
- **SameGroup** : Dummy variable for whether the two stocks belong to same business group.
- **SameIndustry** : Dummy variable for whether the two stocks belong to same Industry.
- **SameSize** : The negative of absolute difference in percentile ranking of size across a pair
- **SameBookToMarket** :The negative of absolute difference in percentile ranking of the book to market ratio across a pair

Summary of Controls

Monthly

Type of Pairs	Yes	No
SameIndustry	1142	9125
	(11.1%)	(88.9%)
SameGroup	1173	9094
	(11.4%)	(88.6%)
ActiveHolder	2819	7448
	(27.5%)	(72.5%)

Variable	count	mean	std	min	25%	50%	75%	max
Size1	303419	0.75	0.22	0.01	0.60	0.81	0.93	1
Size2	303419	0.47	0.26	0.00	0.26	0.44	0.66	1.00
SameSize	303419	-0.28	0.22	-0.99	-0.42	-0.24	-0.10	0.00
BookToMarket1	303419	0.52	0.27	0.00	0.31	0.54	0.74	1.00
BookToMarket2	303419	0.50	0.25	0.00	0.29	0.49	0.70	1.00
SameBookToMarket	303419	-0.30	0.21	-1.00	-0.43	-0.25	-0.12	0.00

Fortnightly

Regression Summary

- **Value** : We use the percentile rank of a particular characteristic for each stock in regression.
- **Interaction** : We use the interaction between percentile rankings for a particular characteristic across a pair in regression.

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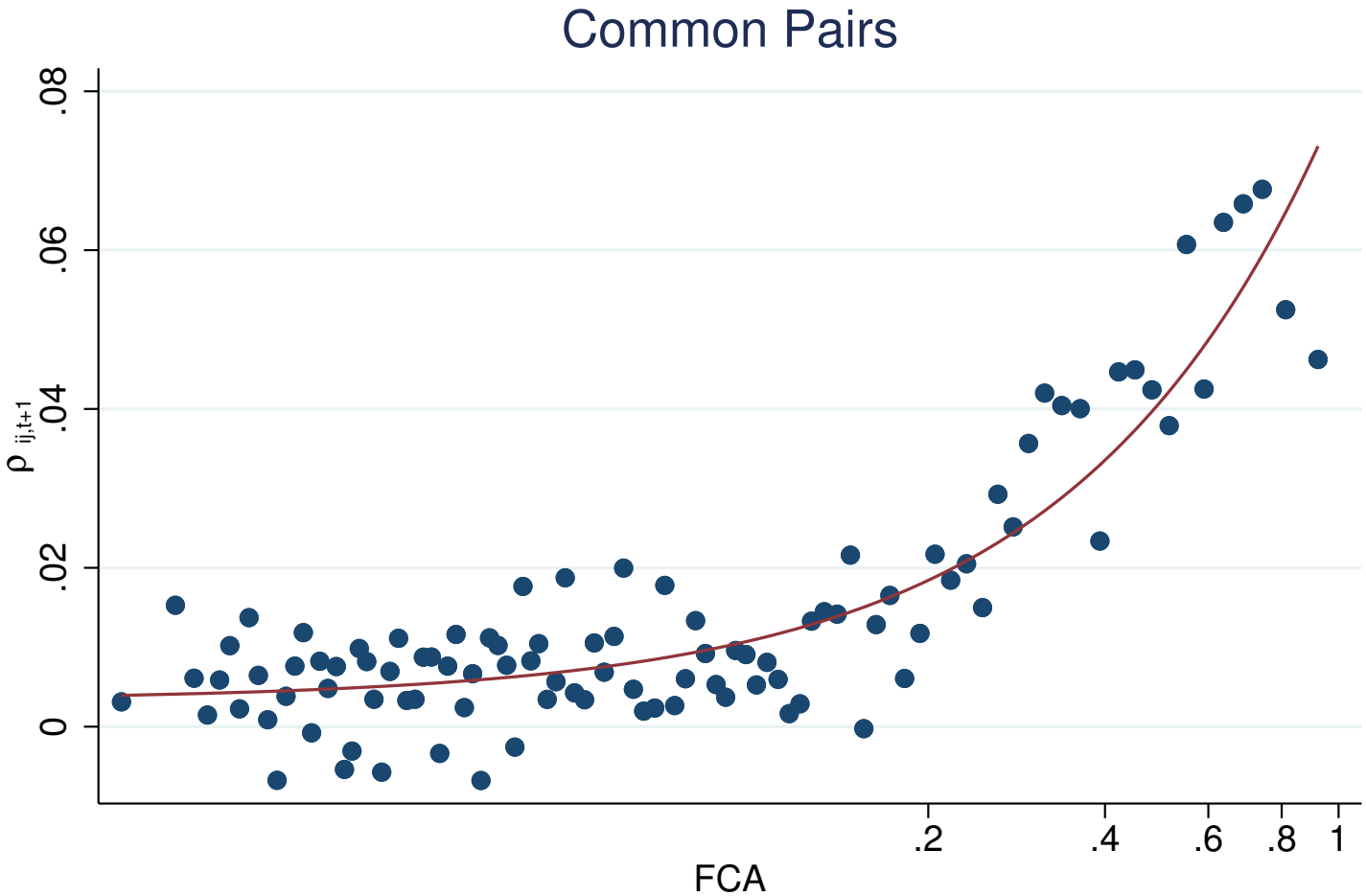
Future Correlation via *FCA*

4 Factor + Industry (Monthly)



This figure graphs the correlation of daily 4Factor+Industry residuals in monthh t+1 against our measure of institutional connectedness.

Fama MacBeth Estimation

Monthly variables

	Dependent Variable:Future Monthly Correlation of 4F+Industry Residuals								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(FCA)	0.0107***	0.00890***	0.00510***	0.00892***	0.00409***	0.00322***	0.00321***	0.00334***	0.00355***
	(7.17)	(9.13)	(5.07)	(8.94)	(4.91)	(4.82)	(4.79)	(4.85)	(4.60)
ρ_t		0.145***	0.144***	0.145***	0.143***	0.141***	0.141***	0.141***	0.143***
		(6.36)	(6.30)	(6.36)	(6.35)	(6.51)	(6.50)	(6.48)	(6.37)
SameGroup			0.0273***		0.0215***	0.0192***	0.0190***	0.0195***	0.0227***
			(9.78)		(6.98)	(5.50)	(5.48)	(5.65)	(7.77)
ActiveHolder				0.00606***	0.00403*	0.00236	0.00246	0.00188	0.00260
				(3.63)	(2.45)	(1.30)	(1.37)	(1.04)	(1.52)
SameIndustry					0.0210***	0.0173***	0.0170***	0.0166***	0.0191***
					(4.43)	(4.77)	(4.55)	(4.37)	(4.15)
Samesize								0.0417**	0.0232***
								(3.20)	(3.99)
SameBookToMarket								0.00788*	0.00866**
								(2.51)	(2.96)
Constant	0.0456***	0.0362***	0.0217***	0.0347***	0.0158***	0.0471**	0.0558***	0.0415***	0.0238***
	(5.63)	(8.51)	(5.27)	(8.34)	(5.03)	(3.26)	(3.50)	(3.84)	(6.17)
Value	No	No	No	No	No	Yes	Yes	No	No
Interaction	No	No	No	No	No	No	Yes	Yes	No
N	287509	286678	286678	286678	286678	286678	286678	286678	286678
R^2	0.00211	0.0380	0.0391	0.0383	0.0407	0.0441	0.0450	0.0439	0.0417

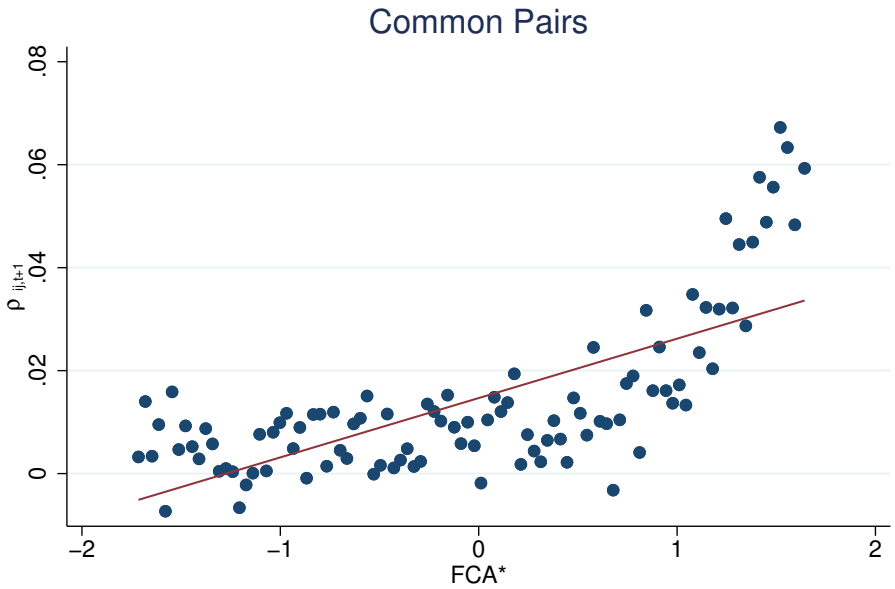
t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

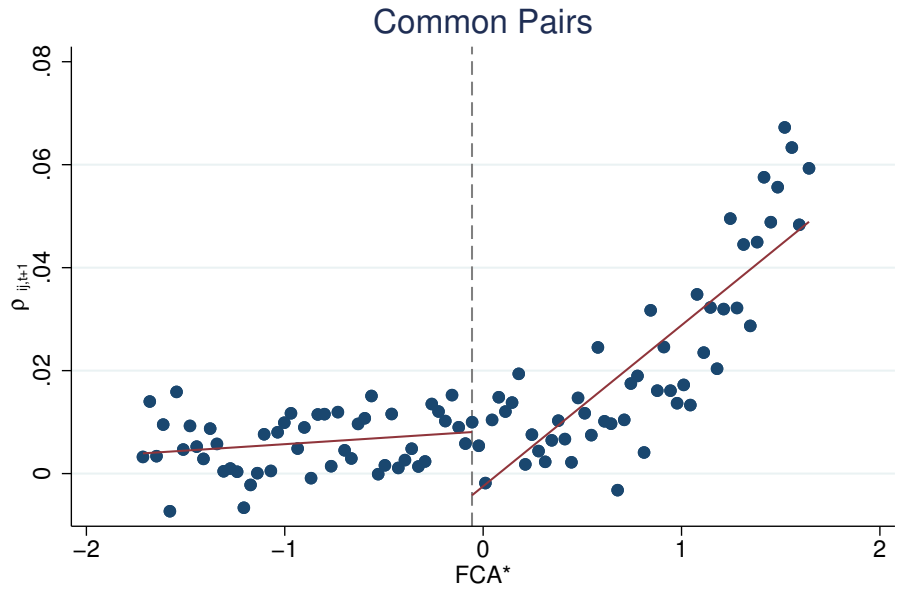
Fortnightly

4 Factor + Industry Future Correlation via *FCA**

Normalized Rank Transformed for each cross section (Monthly)



This figure graphs the correlation of daily 4Factor+Industry residuals in month t+1 against our measure of institutional connectedness.



This figure graphs the correlation of daily 4Factor+Industry residuals in month t+1 against our measure of institutional connectedness. Allow for discontinuity in median

Fortnightly

Fama MacBeth Estimation

Monthly variables

	Dependent Variable:Future Monthly Correlation of 4F+Industry Residuals									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FCA*	0.0122***	-0.00227	-0.00208	-0.000828	-0.00171	-0.000472	-0.00207	-0.00213	-0.00204	-0.00119
	(6.13)	(-1.51)	(-1.53)	(-0.67)	(-1.32)	(-0.41)	(-1.84)	(-1.90)	(-1.80)	(-1.09)
$(FCA^* > Median[FCA^*]) \times FCA^*$		0.0302***	0.0253***	0.0145***	0.0246***	0.0138***	0.0123***	0.0123***	0.0125***	0.0112***
		(7.27)	(7.68)	(4.50)	(7.79)	(4.46)	(4.88)	(4.89)	(4.78)	(4.15)
ρ_t			0.145***	0.144***	0.145***	0.144***	0.141***	0.141***	0.141***	0.143***
			(6.36)	(6.31)	(6.36)	(6.31)	(6.51)	(6.51)	(6.49)	(6.38)
SameGroup				0.0255***		0.0255***	0.0175***	0.0174***	0.0178***	0.0214***
				(9.22)		(9.24)	(4.87)	(4.85)	(4.98)	(7.26)
ActiveHolder					0.00496**	0.00486**	0.00181	0.00188	0.00131	0.00211
					(3.01)	(2.93)	(0.99)	(1.04)	(0.72)	(1.23)
SameIndustry							0.0170***	0.0166***	0.0162***	0.0189***
							(4.73)	(4.50)	(4.34)	(4.15)
Samesize									0.0422**	0.0233***
									(3.26)	(4.00)
SameBookToMarket									0.00776*	0.00853**
									(2.48)	(2.91)
Constant	0.0178***	0.00513	0.00224	0.00267	0.00127	0.00171	0.0347*	0.0429**	0.0284**	0.0102***
	(3.80)	(1.44)	(1.52)	(1.95)	(0.86)	(1.25)	(2.56)	(2.80)	(2.91)	(4.39)
Value	No	No	No	No	No	No	Yes	Yes	No	No
Interaction	No	No	No	No	No	No	No	Yes	Yes	No
N	287509	287509	286678	286678	286678	286678	286678	286678	286678	286678
R^2	0.00184	0.00268	0.0384	0.0394	0.0387	0.0397	0.0444	0.0453	0.0442	0.0420

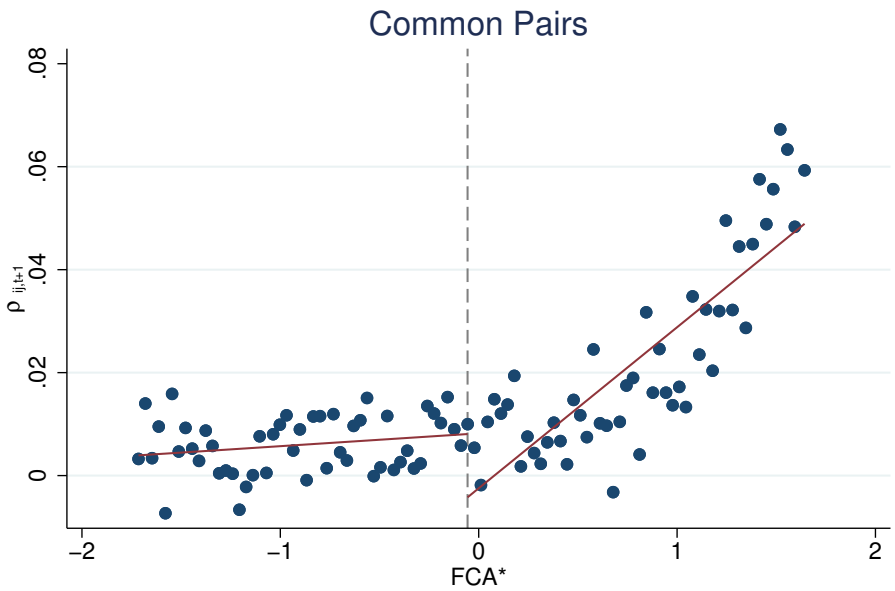
t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

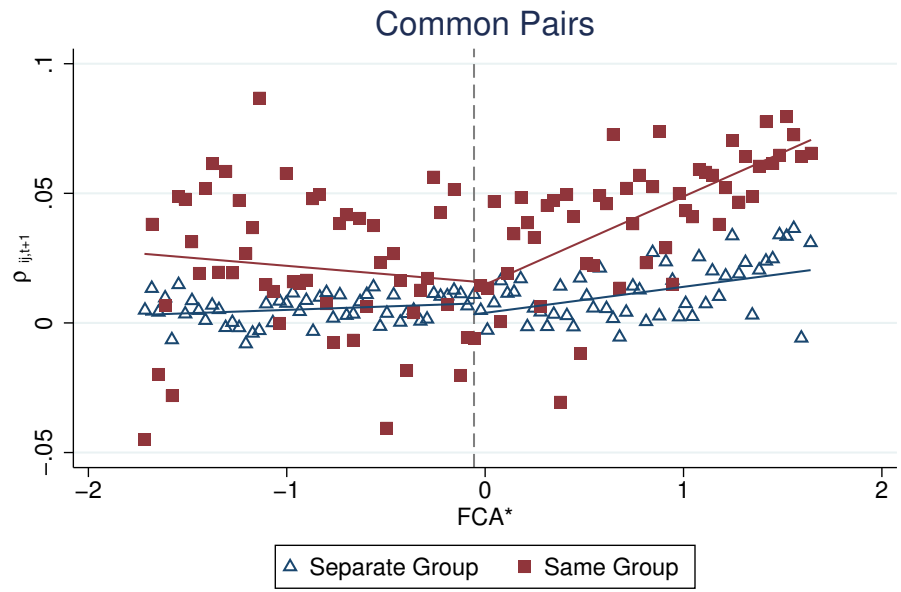
Fortnightly

4 Factor + Industry Future Correlation via *FCA**

Normalized Rank Transformed for each cross section (Monthly)



This figure graphs the correlation of daily 4Factor+Industry residuals in month t+1 against our measure of institutional connectedness. Allow for discontinuity in median



This figure graphs the correlation of daily 4Factor+Industry residuals in month t+1 against our measure of institutional connectedness. Allow for discontinuity in median

Fortnightly

Fama MacBeth Estimation

Monthly variables

	Future Monthly Correlation of 4F+Industry Residuals			
	(1)	(2)	(3)	(4)
FCA*	-0.00111	0.00161	-0.00246	0.00104
	(-0.88)	(1.48)	(-1.87)	(1.04)
$(FCA^* > Median[FCA^*]) \times FCA^*$	0.00666*		0.00866**	
	(2.63)		(3.38)	
SameGroup	0.0144***	0.0147***	0.0118**	0.0122**
	(4.31)	(4.38)	(3.17)	(3.25)
$(FCA^*) \times SameGroup$	0.0107***	0.0123***	0.00857***	0.0108***
	(5.06)	(5.59)	(3.99)	(5.18)
ActiveHolder	0.00199	0.00226	0.00186	0.00223
	(1.13)	(1.29)	(1.01)	(1.21)
$(FCA^*) \times ActiveHolder$	0.00196	0.00196	0.00301*	0.00300
	(1.29)	(1.26)	(2.05)	(1.99)
ρ_t	0.143***	0.143***	0.141***	0.141***
	(6.37)	(6.37)	(6.50)	(6.50)
Constant	0.0116***	0.0140***	0.0436**	0.0466**
	(4.86)	(5.62)	(2.82)	(2.96)
Value	No	No	Yes	Yes
Interaction	No	No	Yes	Yes
N	286678	286678	286678	286678
R^2	0.0426	0.0424	0.0459	0.0457

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Fama MacBeth Estimation

Monthly variables (Grouped by size)

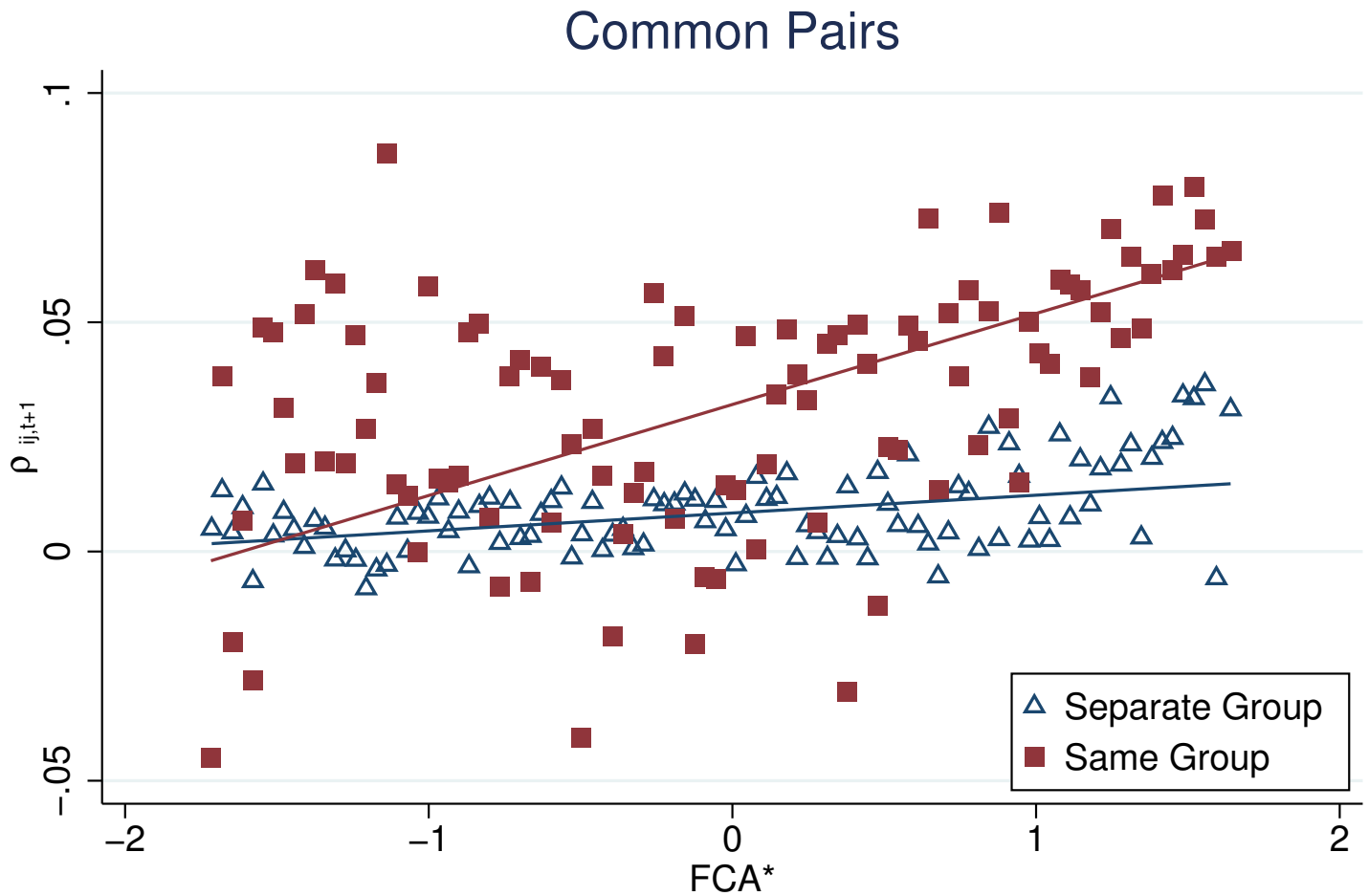
	All Firms		Big Firms		Big & Small Firms		Small Firms	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FCA*	-0.00111	-0.00246	-0.00164	-0.00250	0.00112	0.0000565	-0.00474	-0.00272
	(-0.88)	(-1.87)	(-0.84)	(-1.24)	(0.57)	(0.03)	(-1.15)	(-0.67)
$(FCA^* > Median[FCA^*]) \times FCA^*$	0.00666*	0.00866**	0.0108**	0.0143***	-0.00603	-0.00536	0.0166	0.0147
	(2.63)	(3.38)	(2.81)	(3.64)	(-1.70)	(-1.45)	(1.73)	(1.59)
SameGroup	0.0144***	0.0118**	0.00497	0.00356	0.0207***	0.0199***	0.0121	0.0104
	(4.31)	(3.17)	(1.09)	(0.79)	(4.31)	(4.45)	(1.79)	(1.45)
$(FCA^*) \times$ SameGroup	0.0107***	0.00857***	0.0125***	0.0103**	0.0103**	0.00994**	0.00589	0.00544
	(5.06)	(3.99)	(3.50)	(2.94)	(2.92)	(2.77)	(0.93)	(0.85)
ActiveHolder	0.00199	0.00186	0.00340*	-0.000301	0.00619	0.00637	0.0000826	-0.000577
	(1.13)	(1.01)	(2.27)	(-0.18)	(1.70)	(1.79)	(0.02)	(-0.11)
$(FCA^*) \times$ ActiveHolder	0.00196	0.00301*	0.00190	0.00175	0.00510*	0.00514*	0.00192	0.00118
	(1.29)	(2.05)	(0.94)	(0.84)	(2.15)	(2.18)	(0.70)	(0.39)
ρ_t	0.143***	0.141***	0.112***	0.111***	0.130***	0.130***	0.184***	0.181***
	(6.37)	(6.50)	(6.59)	(6.54)	(5.60)	(5.58)	(6.08)	(5.99)
Constant	0.0116***	0.0436**	0.0104***	-0.160*	0.00757	0.0546***	0.0237**	0.0911***
	(4.86)	(2.82)	(3.97)	(-2.24)	(1.33)	(3.44)	(2.96)	(4.16)
Value	No	Yes	No	Yes	No	Yes	No	Yes
Interaction	No	Yes	No	Yes	No	Yes	No	Yes
N	286678	286678	97793	97793	123391	123391	65494	65494
R^2	0.0426	0.0459	0.0378	0.0424	0.0418	0.0458	0.0667	0.0735

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Future Correlation via *FCA**

4 Factor + Industry (by Business Group)



This figure graphs the correlation of daily 4Factor+Industry residuals in month t+1 against normalized rank transformed of our measure of institutional connectedness.

Fama MacBeth Estimation

Monthly variables (Grouped by be in the same group or not)

	Different Group						Same Group					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
FCA*	0.00696*	-0.000943	0.00248**	0.000371	0.00227**	-0.000780	0.0115	-0.0154	0.0105***	0.00120	0.00899***	-0.000541
	(2.04)	(-0.50)	(2.78)	(0.33)	(2.79)	(-0.69)	(1.69)	(-1.31)	(4.45)	(0.22)	(4.63)	(-0.10)
$(FCA^* > Median[FCA^*]) \times FCA^*$		0.0203		0.00523*		0.00769**		0.0407***		0.0147		0.0151
		(1.61)		(2.35)		(2.97)		(3.59)		(1.60)		(1.85)
ρ_t			0.128***	0.128***	0.127***	0.127***			0.206***	0.206***	0.203***	0.203***
			(5.80)	(5.80)	(5.87)	(5.87)			(8.81)	(8.86)	(9.17)	(9.22)
ActiveHolder			-0.00118	-0.00135	-0.00226	-0.00254			0.0191*	0.0184*	0.0208**	0.0200**
			(-1.00)	(-1.16)	(-1.77)	(-1.98)			(2.61)	(2.47)	(2.88)	(2.75)
SameGroup × SamePosition			0	0	0	0			0.00880*	0.00741	0.00573	0.00433
			(.)	(.)	(.)	(.)			(2.05)	(1.79)	(1.47)	(1.12)
Constant	0.0123*	0.00584**	0.0126***	0.0108***	0.0328*	0.0302*	0.0360***	0.0186**	0.0343***	0.0274***	0.0870***	0.0798***
	(2.54)	(3.02)	(5.57)	(4.56)	(2.22)	(2.06)	(5.68)	(3.31)	(6.74)	(4.45)	(4.55)	(4.28)
Value	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Interaction	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
N	242504	242504	241802	241802	241802	241802	45005	45005	44876	44876	44876	44876
R^2	0.00123	0.00227	0.0346	0.0348	0.0377	0.0380	0.00927	0.0117	0.0814	0.0832	0.0920	0.0937

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Fortnightly

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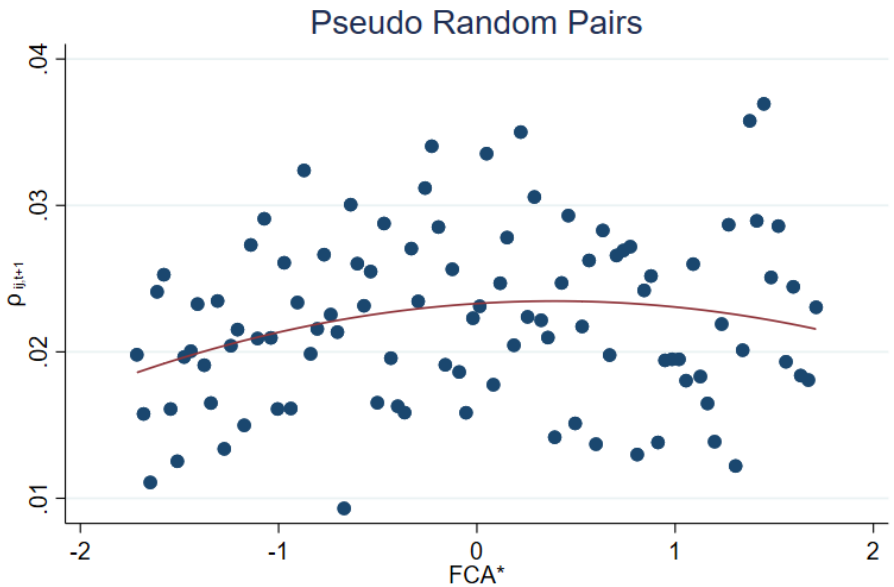
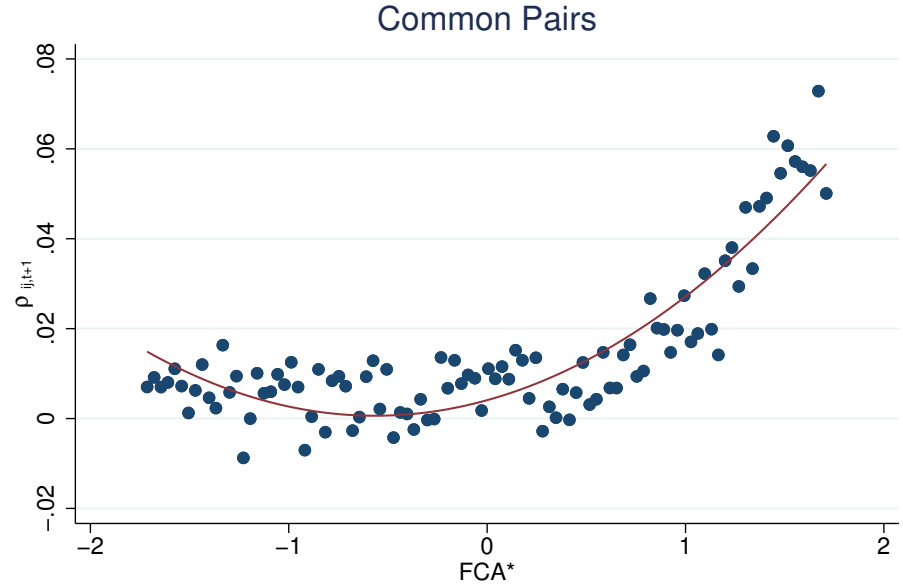
Random Pairs



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against normalized rank transformed of our measure of institutional connectedness.



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against our measure of institutional connectedness.

Fama MacBeth Estimation for pseudo pairs

Fortnightly variables for Random group

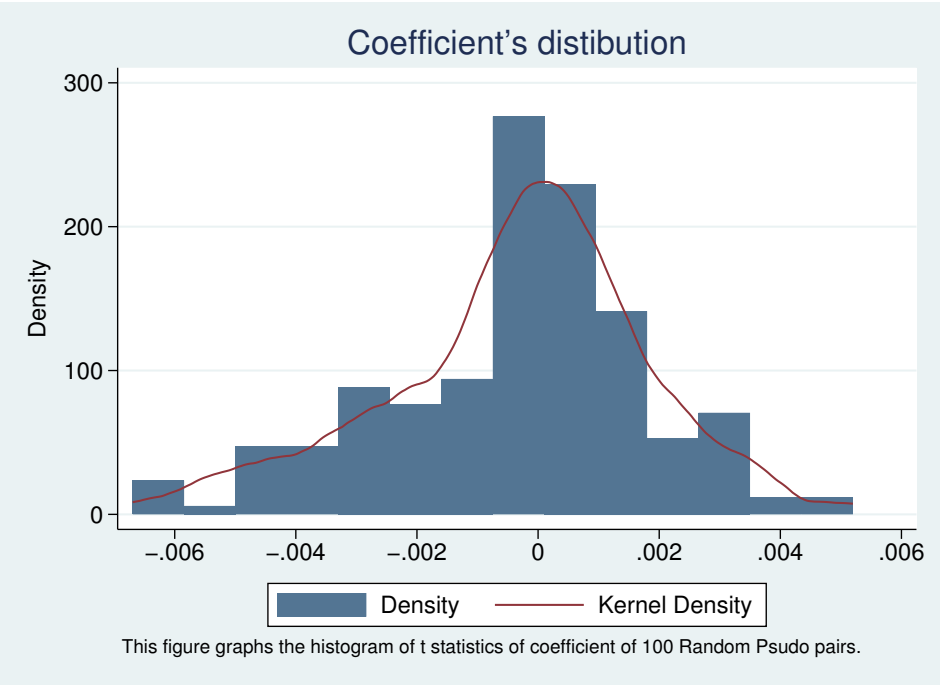
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FCA*	0.000606	0.00333**	0.00261**	0.00206*	0.00244*	0.00202*	0.00190
	(0.99)	(2.60)	(2.71)	(2.11)	(2.49)	(2.04)	(1.94)
(FCA* > *Median*[FCA*]) × FCA*		-0.00559*	-0.00427*	-0.00316	-0.00377*	-0.00314	-0.00274
		(-2.57)	(-2.56)	(-1.84)	(-2.19)	(-1.82)	(-1.63)
ActiveHolder			0.0000628	-0.000258	-0.000307	-0.000319	0.0000163
			(0.06)	(-0.23)	(-0.27)	(-0.28)	(0.01)
Constant	0.0219***	0.0243***	0.0173***	0.0666***	0.121***	0.0508***	0.0299***
	(5.27)	(5.75)	(6.82)	(11.33)	(18.46)	(10.35)	(8.12)
Main	No	No	No	Yes	Yes	No	No
Interaction	No	No	No	No	Yes	Yes	No
N	1105543	1105543	1067554	1067554	1067554	1067554	1067554
r2	0.000237	0.000448	0.223	0.227	0.228	0.226	0.225

t statistics in parentheses

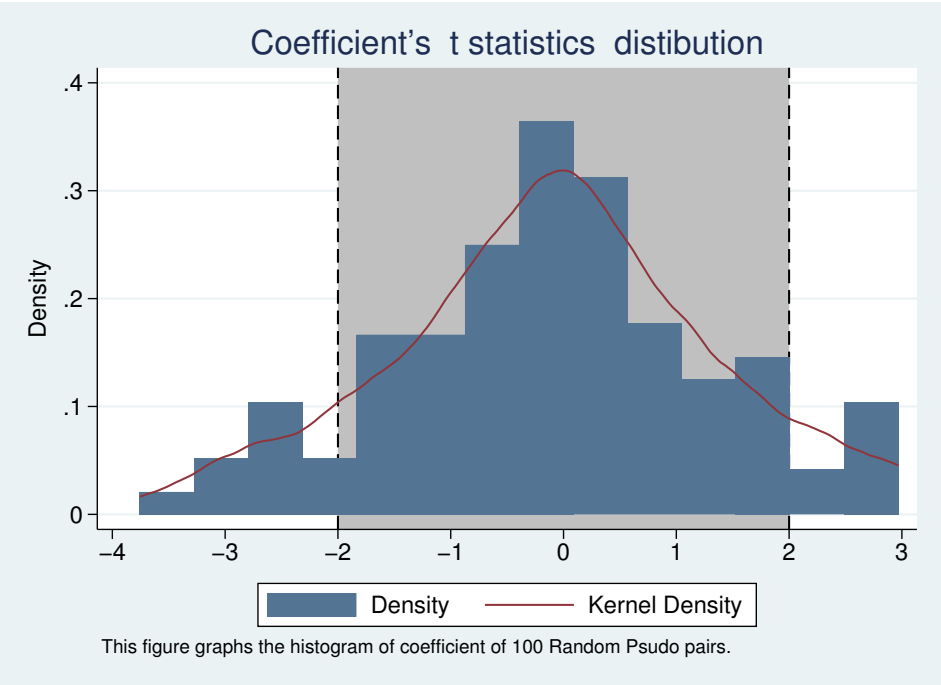
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Random Pairs

$$(\text{FCA}^* > \textit{Median}[\text{FCA}^*]) \times \text{FCA}^*$$

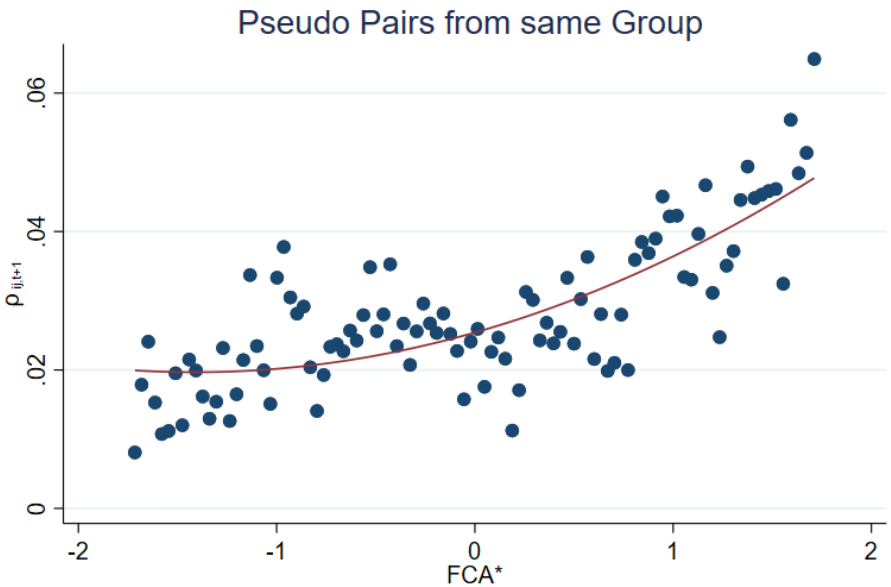


This figure graphs the histogram of t statistics of coefficient of 100 Random Psudo pairs.

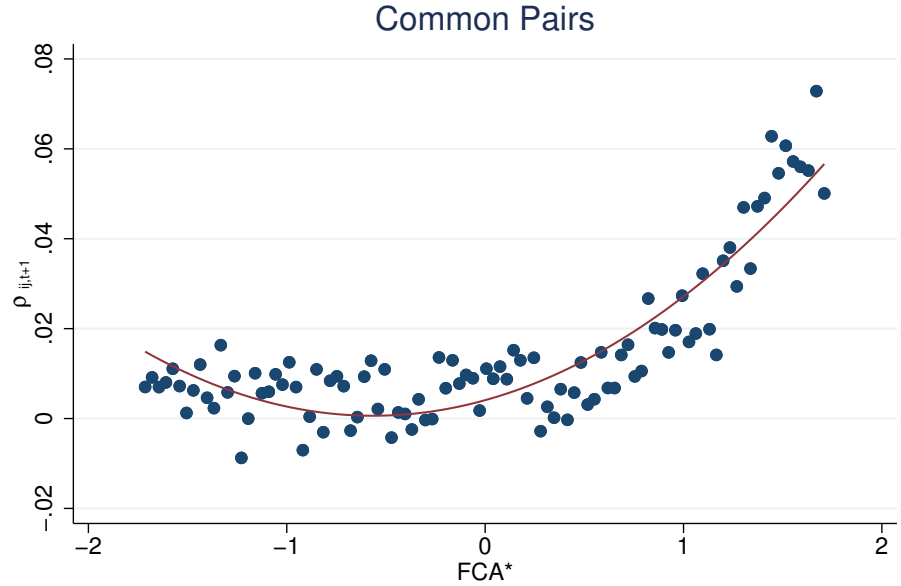


This figure graphs the histogram of coefficient of 100 Random Psudo pairs.

Random Pairs from Same Business Group



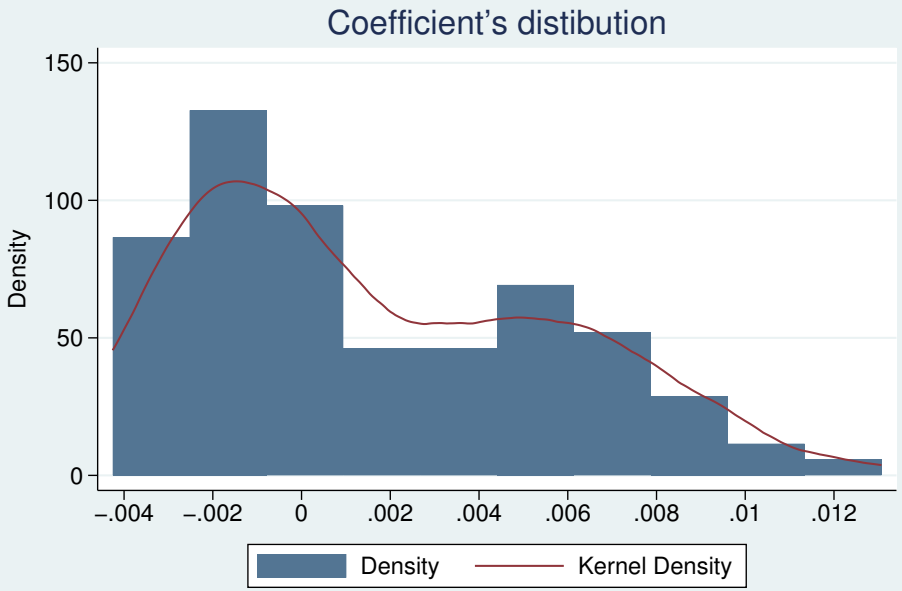
This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against normalized rank transformed of our measure of institutional connectedness.



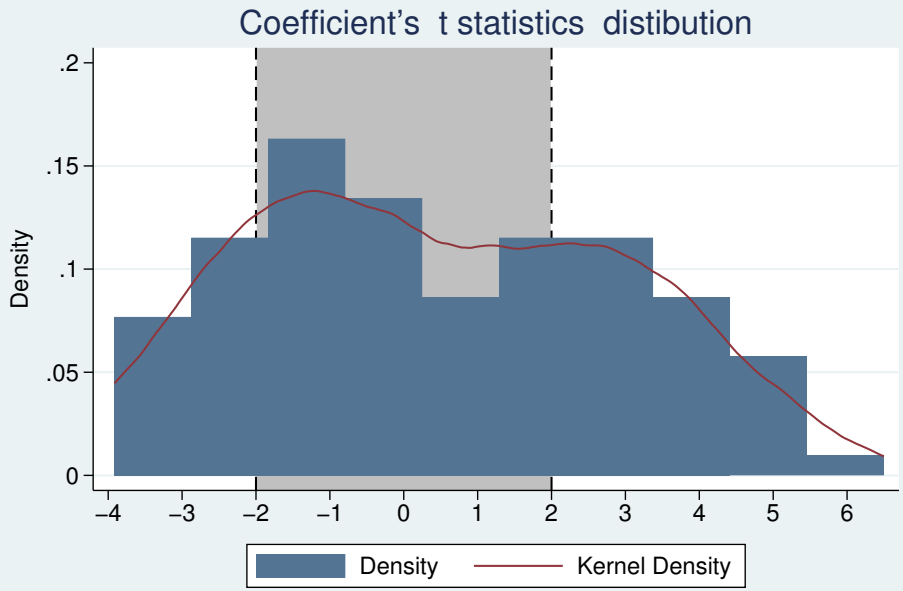
This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against our measure of institutional connectedness.

Random Pairs from Same Business Group

$$(\text{FCA}^* > \textit{Median}[\text{FCA}^*]) \times \text{FCA}^*$$



This figure graphs the histogram of t statistics of coefficient of 100 Random Psudo pairs from same business group.



This figure graphs the histogram of coefficient of 100 Random Psudo pairs from same business group.

Fama MacBeth Estimation for pseudo pairs

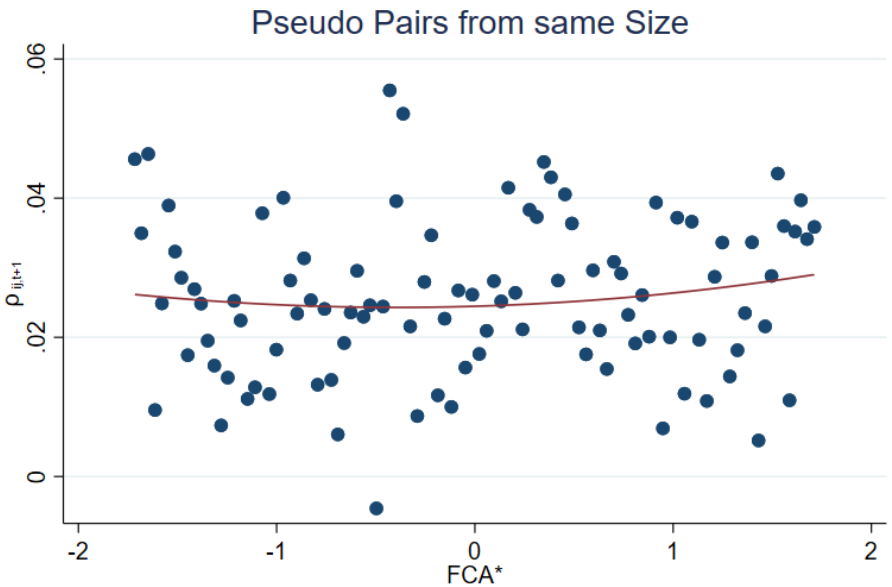
Fortnightly variables for Random group from Same Business Group

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FCA*	0.00808***	0.00365*	0.00230	-0.000386	-0.000628	-0.000128	0.000500
	(10.59)	(2.37)	(1.88)	(-0.31)	(-0.50)	(-0.11)	(0.42)
(FCA* > *Median*[FCA*]) × FCA*		0.00932**	0.00691**	0.000962	0.00104	-0.000242	-0.00233
		(3.24)	(3.18)	(0.46)	(0.49)	(-0.12)	(-1.18)
ActiveHolder			0.00648***	0.00223	0.0000493	0.00285*	0.00325**
			(5.09)	(1.87)	(0.04)	(2.52)	(2.86)
Constant	0.0288***	0.0248***	0.0160***	0.115***	0.232***	0.0821***	0.0418***
	(8.08)	(6.62)	(6.88)	(15.79)	(26.40)	(14.10)	(11.86)
Main	No	No	No	Yes	Yes	No	No
Interaction	No	No	No	No	Yes	Yes	No
N	1111129	1111129	1073214	1073214	1073214	1073214	1073214
r2	0.000515	0.000796	0.226	0.235	0.240	0.234	0.231

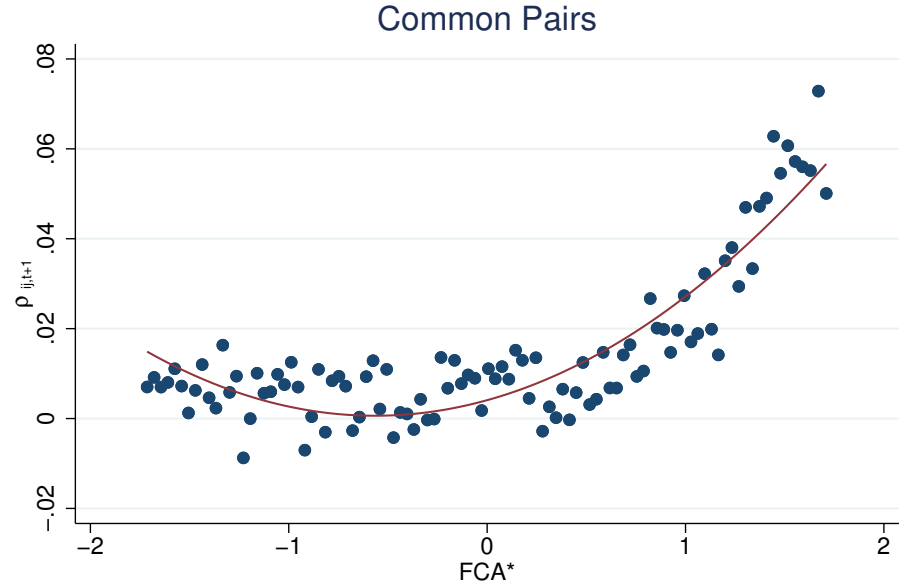
t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Random Pairs from Same Size



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against normalized rank transformed of our measure of institutional connectedness.



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against our measure of institutional connectedness.

Fama MacBeth Estimation for pseudo pairs

Fortnightly variables for Pseudo group from Same Size

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FCA*	0.000524	-0.00205	-0.00126	-0.00335	-0.000312	-0.00314	-0.00114
	(0.47)	(-0.68)	(-0.61)	(-1.71)	(-0.17)	(-1.61)	(-0.55)
(FCA* > *Median*[FCA*]) × FCA*		0.00510	0.00375	0.000580	-0.00431	0.00113	0.000589
		(0.99)	(1.04)	(0.17)	(-1.26)	(0.33)	(0.17)
ActiveHolder			-0.00180	0.00129	0.00294	0.0000404	-0.00154
			(-0.69)	(0.53)	(1.18)	(0.02)	(-0.60)
Constant	0.0240***	0.0217***	0.0167***	0.116***	0.255***	0.0792***	0.0347***
	(8.56)	(5.65)	(6.25)	(14.36)	(19.32)	(11.49)	(9.81)
Main	No	No	No	Yes	Yes	No	No
Interaction	No	No	No	No	Yes	Yes	No
N	442279	442279	426218	426218	426218	426218	426218
r2	0.000653	0.00125	0.224	0.238	0.243	0.236	0.232

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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Identification

- Possible Events
  - The Sepah bank Merge
  - Fixed Income Rule change
  - Mutual funds Limit extension
  - Dara 1 and Palayeshi 1
  - Goverment Transfer to Banks
  - Portfolio adjustments

Portfolio adjustments

	Future Monthly Correlation of 4F+Industry Residuals			
	(1)	(2)	(3)	(4)
FCA*	-0.00111	0.00206	-0.00246	0.000160
	(-0.88)	(0.39)	(-1.87)	(0.03)
$(FCA^* > Median[FCA^*]) \times FCA^*$	0.00666*	-0.00337	0.00866**	0.00167
	(2.63)	(-0.31)	(3.38)	(0.15)
SameGroup	0.0144***	0.00392	0.0118**	0.00213
	(4.31)	(0.41)	(3.17)	(0.22)
$(FCA^*) \times$ SameGroup	0.0107***	0.0208*	0.00857***	0.0176*
	(5.06)	(2.44)	(3.99)	(2.05)
ActiveHolder	0.00199	-0.00836	0.00186	-0.00981
	(1.13)	(-1.56)	(1.01)	(-1.80)
$(FCA^*) \times$ ActiveHolder	0.00196	0.00594	0.00301*	0.00674
	(1.29)	(1.15)	(2.05)	(1.30)
ρ_t	0.143***	0.111***	0.141***	0.111***
	(6.37)	(12.00)	(6.50)	(11.98)
Constant	0.0116***	0.00834	0.0436**	0.0233
	(4.86)	(1.26)	(2.82)	(1.18)
Value	No	No	Yes	Yes
Interaction	No	No	Yes	Yes
EndOfYear	No	Yes	No	Yes
N	286678	21022	286678	21022
R^2	0.0426	0.0133	0.0459	0.0138

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$


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Andrew Koch, Stefan Ruenzi, Laura Starks , *Commonality in Liquidity A Demand-Side Explanation* ,The Review of Financial Studies 2016


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Acharya,V., and L. Pedersen , *Asset pricing with liquidity risk* ,Journal of Financial Economics 2005


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Boubaker, S., Mansali, H., Rjiba, H.-*Large controlling shareholders and stock price synchronicity* , Journal of Banking and finance 2014


Morck, R., Yeung, B., Yu, W., *The information content of stock markets: Why do emerging markets have synchronous stock price*, Journal of Financial Economics 2000

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Measuring Common Ownership

Proof

- If two stocks in pair have n mutual owner, which total market cap divides them equally, the mentioned indexes equal n.
  - Each holder owns $1/n$ of each firm.
  - Firm's market cap is α_1 and α_2:
  - So for each holder of firms we have $S^f_{i,t} P_{i,t} = \alpha_i$
  - SQRT

$$\left[\frac{\sum_{f=1}^{n} \sqrt{\alpha_1/n} + \sum_{f=1}^{n} \sqrt{\alpha_2/n}}{\sqrt{\alpha_1} + \sqrt{\alpha_2}}\right]^2 = \left[\frac{\sqrt{n}(\sqrt{\alpha_1} + \sqrt{\alpha_2})}{\sqrt{\alpha_1} + \sqrt{\alpha_2}}\right]^2 = n$$

  - Quadratic

$$\left[\frac{\sum_{f=1}^{n} (\alpha_1/n)^2 + \sum_{f=1}^{n} (\alpha_2/n)^2}{\alpha_1^2 + {\alpha_2}^2}\right]^{-1} = \left[\frac{\alpha_1^2 + \alpha_2^2}{n(\alpha_1^2 + \alpha_2^2)}\right]^{-1} = n$$

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Synchronicity and firm interlocks

JFE-2009-Khanna

- Three types of network
  1. Equity network
  2. Director network
  3. Owner network
- Dependent variables

  Using deterended weekly return for calculation
  1. Pairwise returns synchronicity $= \frac{\sum_t (n^{up}_{i,j,t} n^{down}_{i,j,t})}{T_{i,j}}$
  2. Correlation $= \frac{Cov(i,j)}{\sqrt{Var(i).Var(j)}}$
- Tobit estimation of

$$f^d_{i,j} = \alpha I_{i,j} + \beta(1 * N_{i,j}) + \gamma Ind_{i,j} + \varepsilon_{i,j}$$

being in the same director network has a significant effect

Large controlling shareholder and stock price synchronicity

JBF-2014-Boubaker

- Stock price synchronicity:

$$SYNCH = \log(\frac{R^2_{i,t}}{1 - R^2_{i,t}})$$

where $R^2_{i,t}$ is the R-squared value from

$$RET_{i,w} = \alpha + \beta_1 MKRET_{w-1} + \beta_2 MKRET_w + \beta_3 INDRET_{i,w-1} + \beta_4 INDRET_{i,w} + \varepsilon_{i,w}$$

- OLS estimation of

$$SYNCH_{i,t} = \beta_0 + \beta_1 Excess_{i,t} + \beta_2 UCF_{i,t} + \sum_k \beta_k Control^k_{i,t} + IndustryDummies + YearDummies + \varepsilon_{i,t}$$

- Stock price synchronicity increases with excess control
- Firms with substantial excess control are more likely to experience stock price crashes

Connected Stocks

JF-2014-Anton Polk

- Common active mutual fund owners
- Measuring Common Ownership
  - $FCAP_{ij,t} = \frac{\sum_{f=1}^{F}(S_{i,t}^{f} P_{i,t} + S_{j,t}^{f} P_{j,t})}{S_{i,t} Pi,t + S_{j,t} Pj,t}$
  - Using normalized rank-transformed as $FCAP_{ij,t}^{*}$
- $\rho_{ij,t}$: within-month realized correlation of each stock pair's daily four-factor returns
-

$$\rho_{ij,t+1} = a + b_f \times FCAPF_{ij,t}^{*} + \sum_{k=1}^{n} CONTROL_{ij,t,k} + \varepsilon_{ij,t+1}$$

Estimate these regressions monthly and report the time-series average as in Fama and MacBeth

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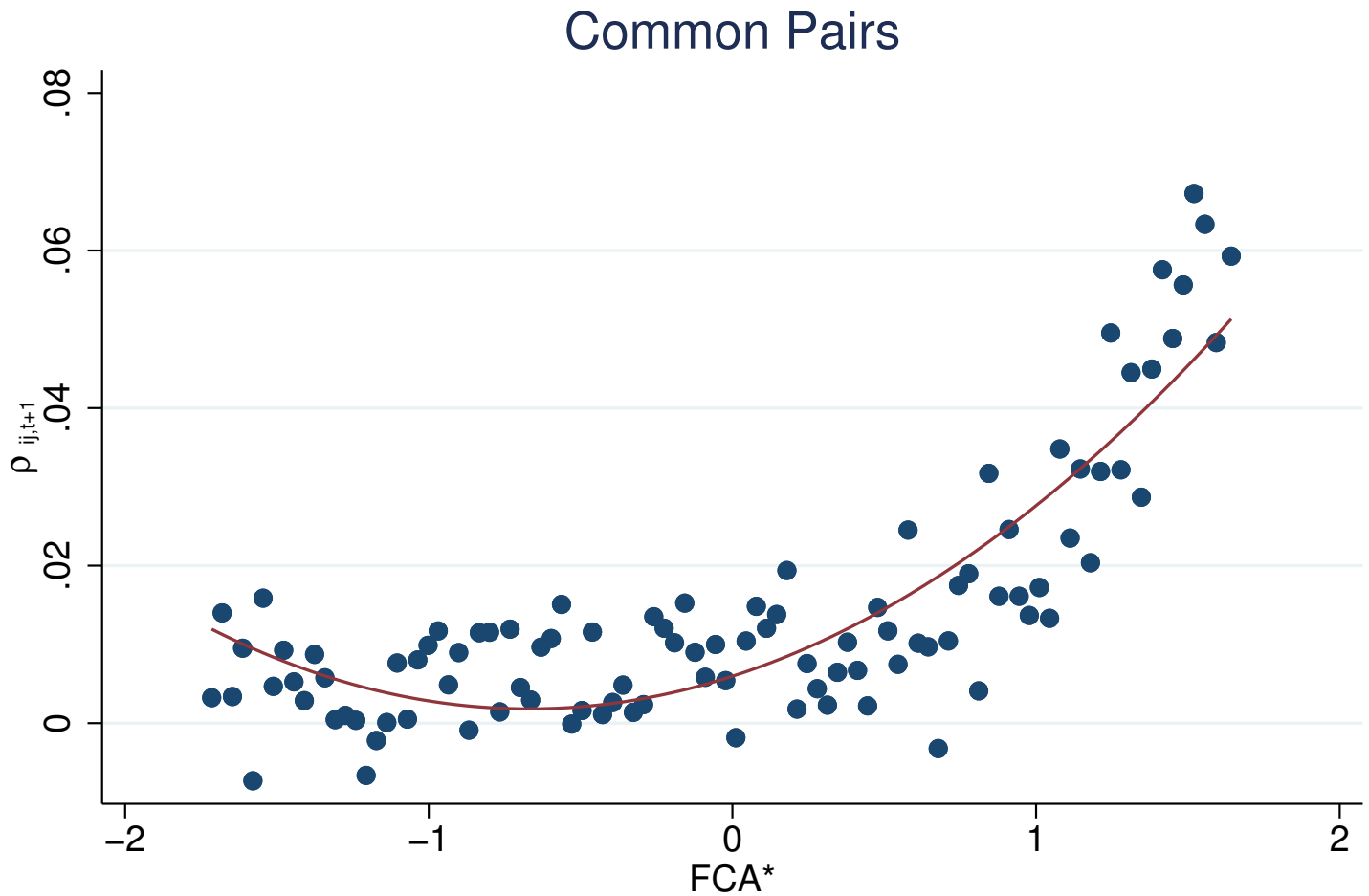
4 Factor + Industry Future Correlation via FCA^*

Normalized Rank Transformed for each cross section (Monthly)



This figure graphs the correlation of daily 4Factor+Industry residuals in month t+1 against our measure of institutional connectedness.

Fama MacBeth Estimation

Monthly variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FCA*	0.0122***	0.0131***	0.0108***	0.00418***	0.00418***	0.00433***	0.00569***
	(6.17)	(6.26)	(7.77)	(4.75)	(4.75)	(4.75)	(4.35)
FCA^{*2}		0.00948***	0.00793***	0.00392***	0.00397***	0.00399***	0.00429***
		(7.49)	(7.91)	(5.15)	(5.20)	(5.02)	(4.42)
ρ_t			0.145***	0.141***	0.141***	0.141***	0.144***
			(6.35)	(6.51)	(6.50)	(6.48)	(6.33)
ActiveHolder				0.000958	0.000952	0.000375	0.00252
				(0.52)	(0.53)	(0.20)	(1.53)
SameGroup				0.0170***	0.0169***	0.0173***	0.0257***
				(4.78)	(4.75)	(4.89)	(9.78)
SameIndustry				0.0171***	0.0167***	0.0163***	
				(4.63)	(4.41)	(4.26)	
Samesize						0.0433**	0.0265***
						(3.22)	(4.00)
SameBookToMarket						0.00811*	0.0114***
						(2.64)	(4.27)
Constant	0.0177***	0.00875*	0.00534**	0.0369*	0.0442**	0.0308**	0.0146***
	(3.84)	(2.33)	(3.42)	(2.63)	(2.82)	(2.98)	(4.73)
Value	No	No	No	Yes	Yes	No	No
Interaction	No	No	No	No	Yes	Yes	No
N	287000	287000	286155	286155	286155	286155	286155
r2	0.00188	0.00281	0.0386	0.0446	0.0455	0.0444	0.0410

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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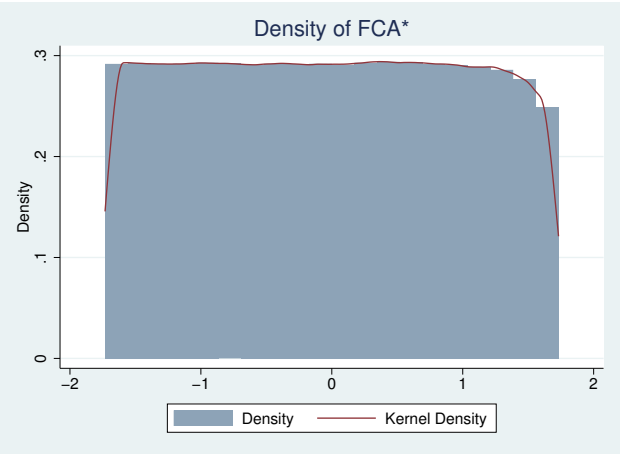
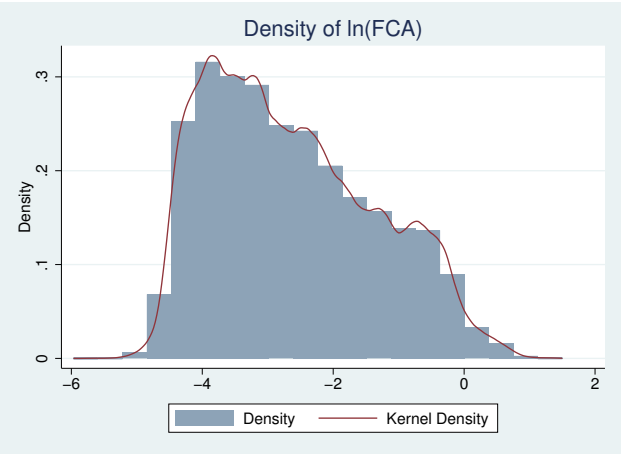
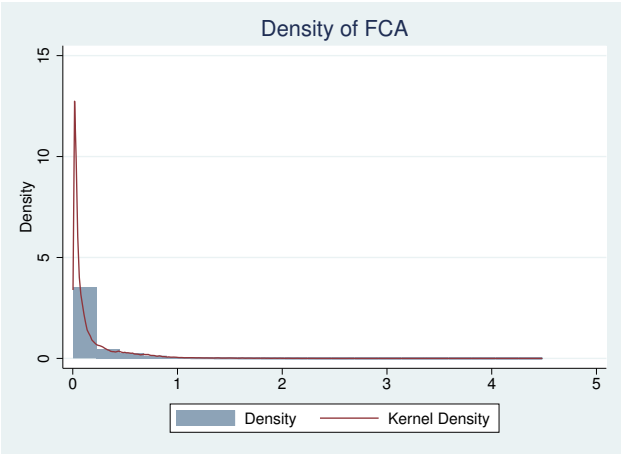
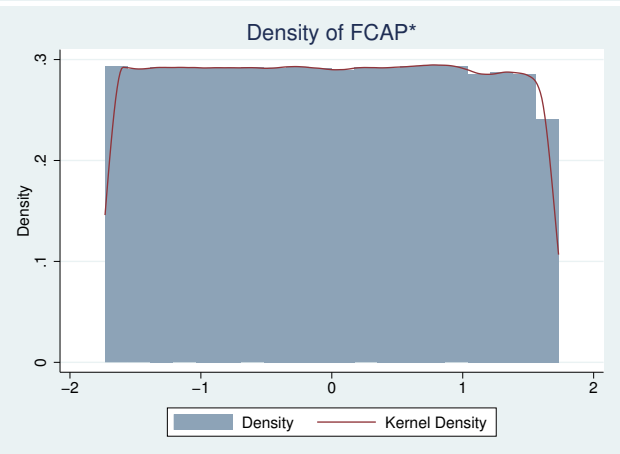
FCA vs. FCAP Distributions

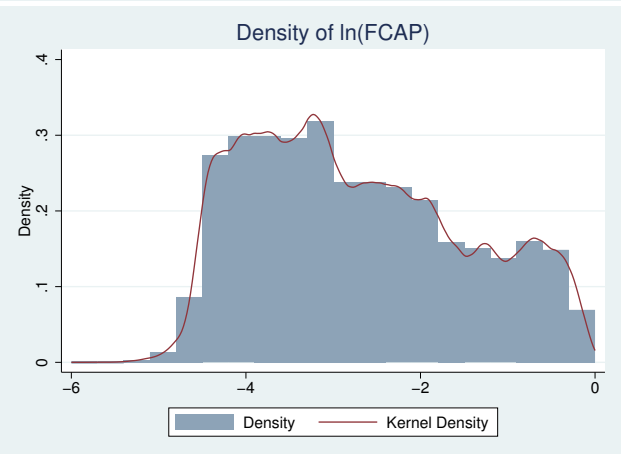
Fortnightly

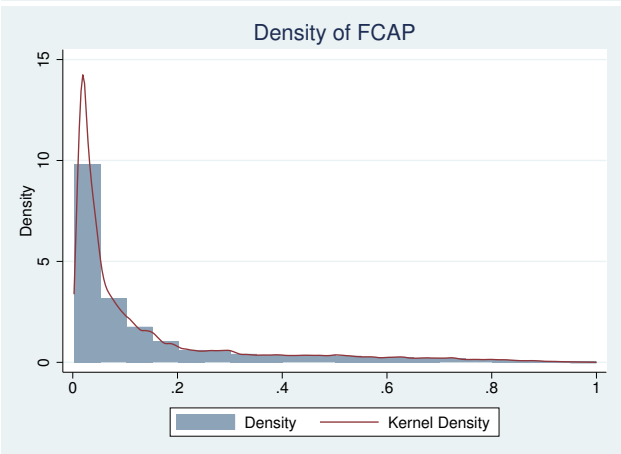












Monthly

Summary of Controls

Fortnightly

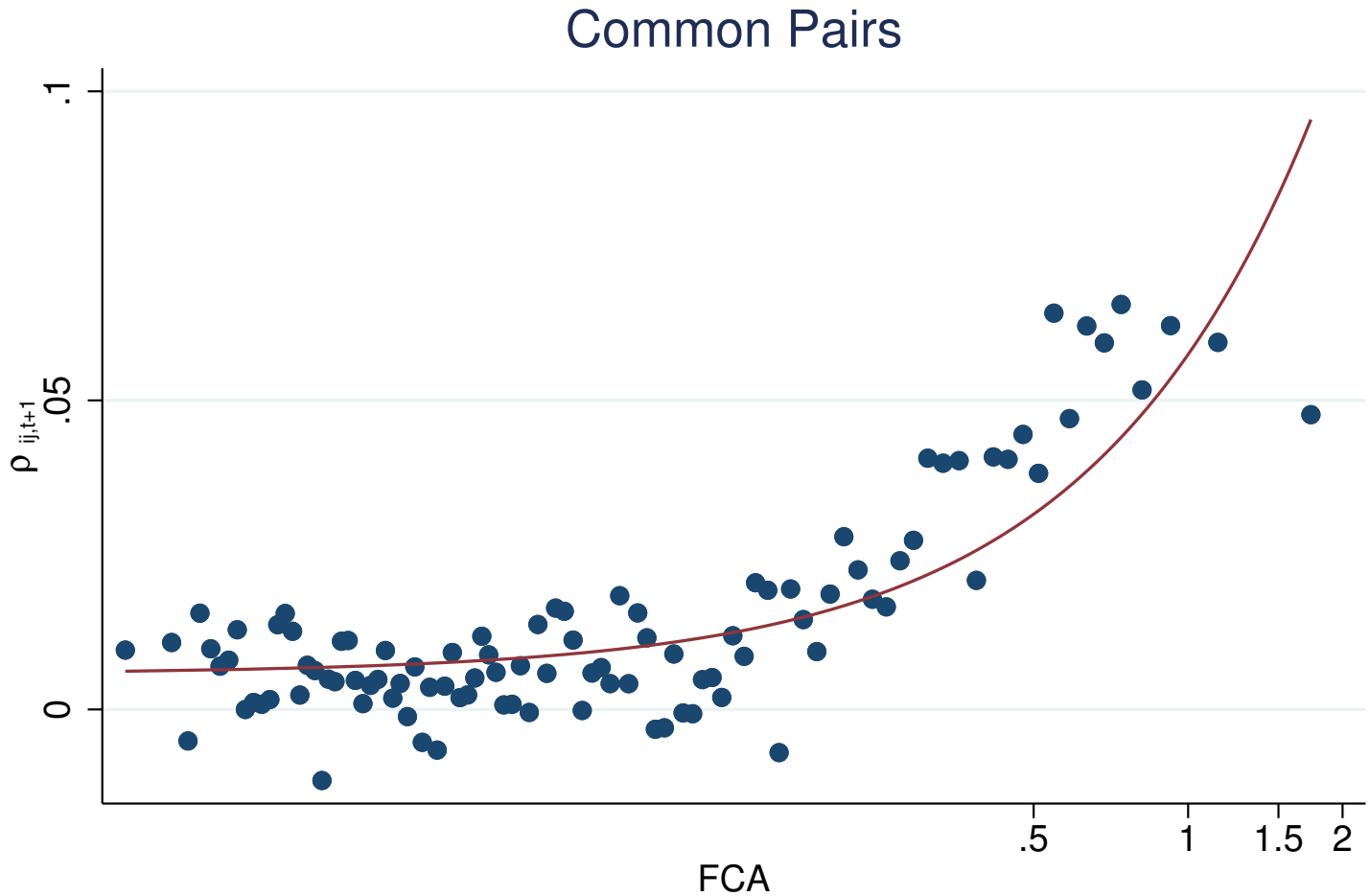
Type of Pairs	Yes	No
SameIndustry	1142	9125
	(11.1%)	(88.9%)
SameGroup	1173	9094
	(11.4%)	(88.6%)
ActiveHolder	2819	7448
	(27.5%)	(72.5%)

Variable	count	mean	std	min	25%	50%	75%	max
Size1	636641	0.75	0.21	0.01	0.61	0.81	0.93	1
Size2	636641	0.47	0.26	0.00	0.26	0.45	0.67	1.00
SameSize	636641	-0.28	0.22	-0.99	-0.42	-0.24	-0.10	0.00
BookToMarket1	636641	0.52	0.27	0.00	0.31	0.54	0.74	1.00
BookToMarket2	636641	0.50	0.25	0.00	0.29	0.49	0.70	1.00
SameBookToMarket	636641	-0.29	0.21	-1.00	-0.43	-0.25	-0.12	0.00

Monthly

Future Correlation via *FCA*

4 Factor + Industry (Fortnightly)



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against our measure of institutional connectedness.

Fama MacBeth Estimation

Fortnightly variables

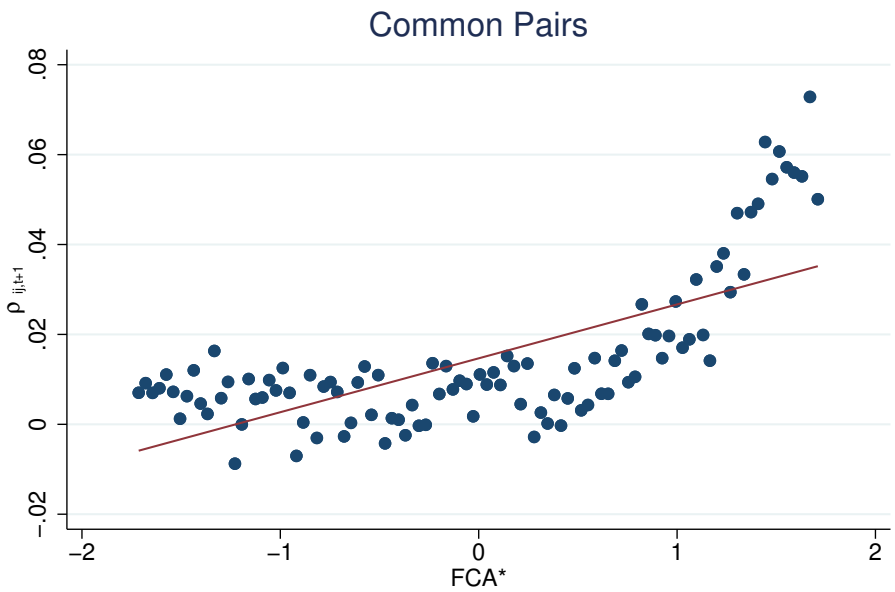
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln(FCA)	0.0108***	0.00989***	0.00964***	0.00511***	0.00499***	0.00271***	0.00276***	0.00281***	0.00297***
	(8.48)	(9.12)	(8.81)	(5.15)	(4.95)	(4.12)	(4.07)	(4.16)	(3.78)
ρ_t		0.0740***	0.0739***	0.0734***	0.0733***	0.0710***	0.0708***	0.0711***	0.0723***
		(5.50)	(5.49)	(5.44)	(5.44)	(5.36)	(5.34)	(5.36)	(5.39)
ActiveHolder			0.00970***		0.00810***	0.00425*	0.00416*	0.00356	0.00410*
			(6.05)		(5.06)	(2.35)	(2.40)	(1.94)	(2.41)
SameGroup				0.0329***	0.0322***	0.0216***	0.0214***	0.0218***	0.0247***
				(10.98)	(10.80)	(7.32)	(7.29)	(7.47)	(9.32)
SameIndustry						0.0275***	0.0267***	0.0264***	0.0288***
						(7.00)	(6.73)	(6.55)	(6.45)
Samesize								0.0403***	0.0235***
								(3.53)	(4.35)
SameBookToMarket								0.0127**	0.0146***
								(3.22)	(4.34)
Constant	0.0432***	0.0395***	0.0363***	0.0214***	0.0191***	0.0396**	0.0504**	0.0372***	0.0225***
	(8.14)	(8.73)	(8.10)	(5.32)	(4.71)	(3.13)	(3.20)	(4.04)	(5.91)
Value	No	No	No	No	No	Yes	Yes	No	No
Interaction	No	No	No	No	No	No	Yes	Yes	No
N	613875	613875	613875	613875	613875	613875	613875	613875	613875
r2	0.00152	0.0127	0.0131	0.0137	0.0141	0.0184	0.0193	0.0183	0.0164

t statistics in parentheses

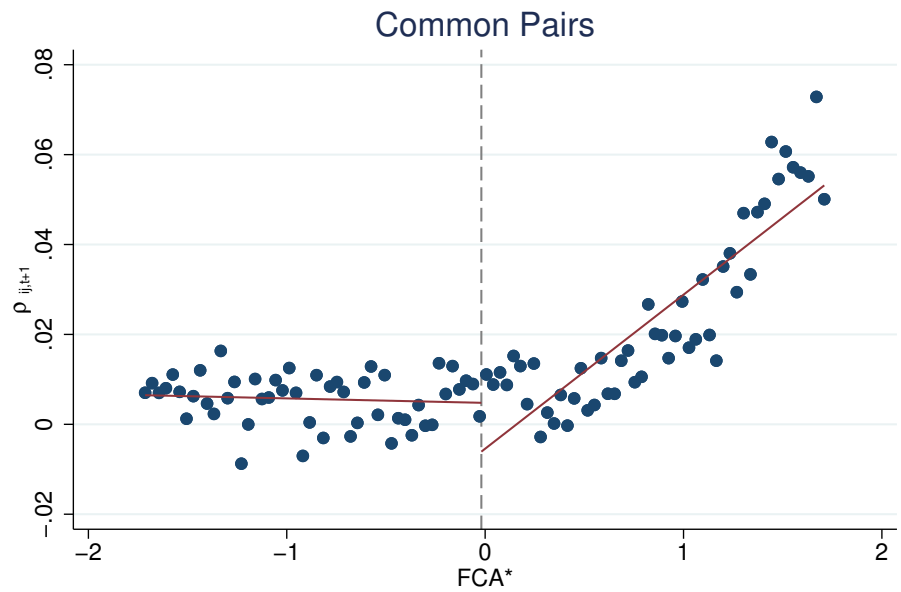
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4 Factor + Industry Future Correlation via *FCA**

Normalized Rank Transformed for each cross section (Fortnightly)



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against our measure of institutional connectedness.



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against our measure of institutional connectedness. Allow for discontinuity in median

Monthly

Fama MacBeth Estimation

Fortnightly variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FCA*	0.0124***	-0.00545***	-0.00518***	-0.00450***	-0.00440***	-0.00408**	-0.00537***	-0.00420**	-0.00526***	-0.00448***
	(7.43)	(-3.99)	(-3.90)	(-3.44)	(-3.40)	(-3.19)	(-4.06)	(-3.22)	(-3.98)	(-3.49)
(FCA* > *Median*[FCA*]) × FCA*		0.0360***	0.0332***	0.0314***	0.0240***	0.0232***	0.0228***	0.0156***	0.0231***	0.0231***
		(9.80)	(10.20)	(9.78)	(8.68)	(8.29)	(9.37)	(5.83)	(9.14)	(8.17)
ρ_t			0.0738***	0.0737***	0.0727***	0.0727***	0.0711***	0.0708***	0.0712***	0.0724***
			(5.50)	(5.49)	(5.42)	(5.41)	(5.38)	(5.34)	(5.38)	(5.41)
ActiveHolder				0.00792***		0.00494**	0.00362	0.00322	0.00284	0.00354*
				(4.85)		(2.98)	(1.94)	(1.81)	(1.49)	(2.02)
SameIndustry					0.0363***	0.0357***	0.0315***	0.0261***	0.0303***	0.0339***
					(8.06)	(7.91)	(7.93)	(6.60)	(7.47)	(7.54)
SameGroup								0.0191***		
								(6.14)		
Samesize									0.0416***	0.0213***
									(3.67)	(3.91)
SameBookToMarket									0.0128**	0.0147***
									(3.24)	(4.36)
Constant	0.0150***	-0.000422	-0.000591	-0.00187	-0.00234	-0.00312*	0.0300*	0.0375*	0.0258**	0.00782***
	(6.31)	(-0.25)	(-0.38)	(-1.19)	(-1.70)	(-2.19)	(2.59)	(2.50)	(3.22)	(3.56)
Value	No	No	No	No	No	No	Yes	Yes	No	No
Interaction	No	No	No	No	No	No	No	Yes	Yes	No
N	613875	613875	613875	613875	613875	613875	613875	613875	613875	613875
r2	0.00132	0.00208	0.0132	0.0136	0.0149	0.0151	0.0182	0.0196	0.0181	0.0162

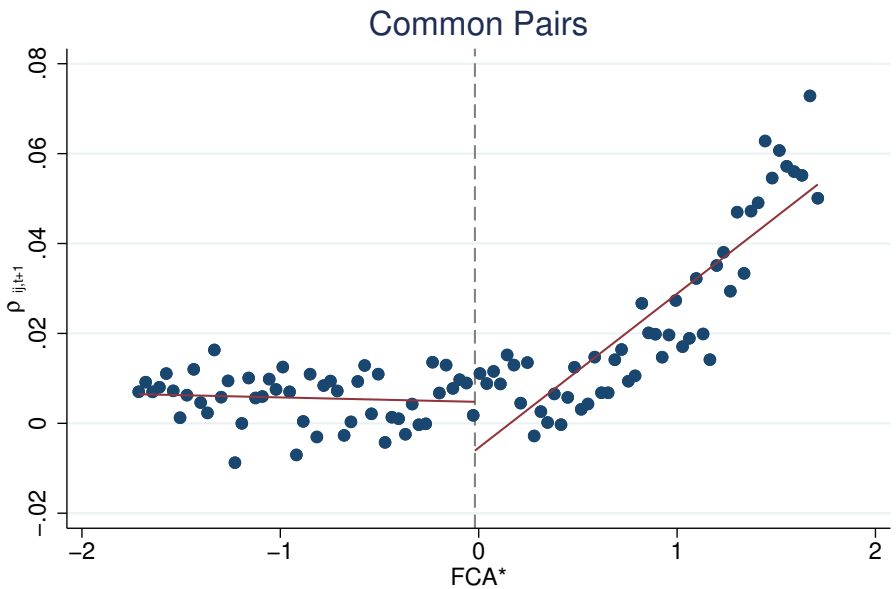
t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

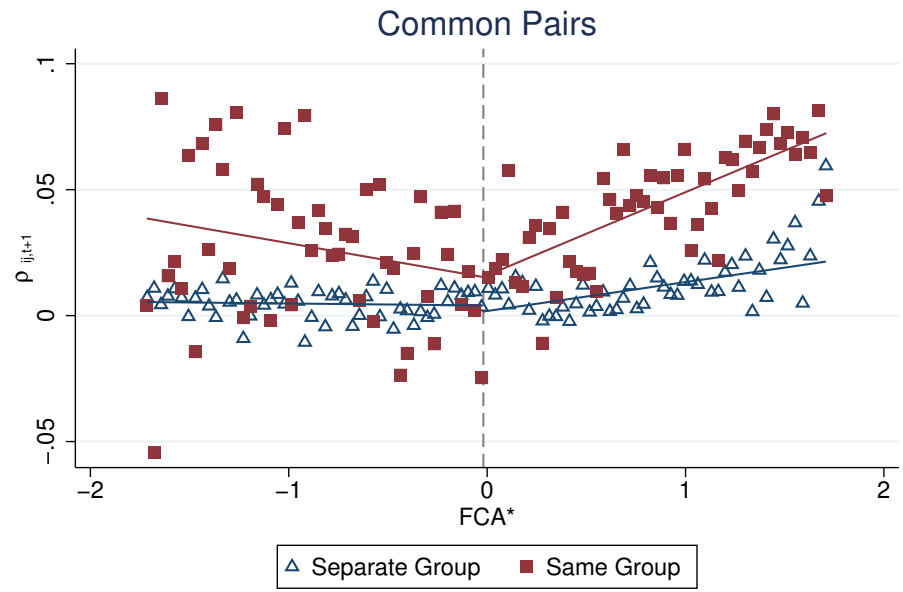
Monthly

4 Factor + Industry Future Correlation via *FCA**

Normalized Rank Transformed for each cross section (Fortnightly)



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against our measure of institutional connectedness. Allow for discontinuity in median



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against our measure of institutional connectedness. Allow for discontinuity in median

Monthly

Fama MacBeth Estimation

Monthly variables

	(1)	(2)
FCA*	-0.00370**	-0.00472***
	(-2.79)	(-3.39)
(FCA* > *Median*[FCA*]) × FCA*	0.0128***	0.0141***
	(4.34)	(5.15)
ρ_t	0.0722***	0.0708***
	(5.39)	(5.35)
ActiveHolder	0.00140	0.000470
	(0.73)	(0.22)
(FCA* > *Median*[FCA*]) × ActiveHolder	0.00338	0.00522
	(1.17)	(1.75)
SameGroup	0.0117**	0.0106**
	(3.29)	(2.87)
(FCA* > *Median*[FCA*]) × SameGroup	0.0139***	0.0109**
	(4.05)	(3.14)
Constant	0.00973***	0.0380*
	(4.57)	(2.51)
Value	No	Yes
Interaction	No	Yes
N	613875	613875
r2	0.0173	0.0202

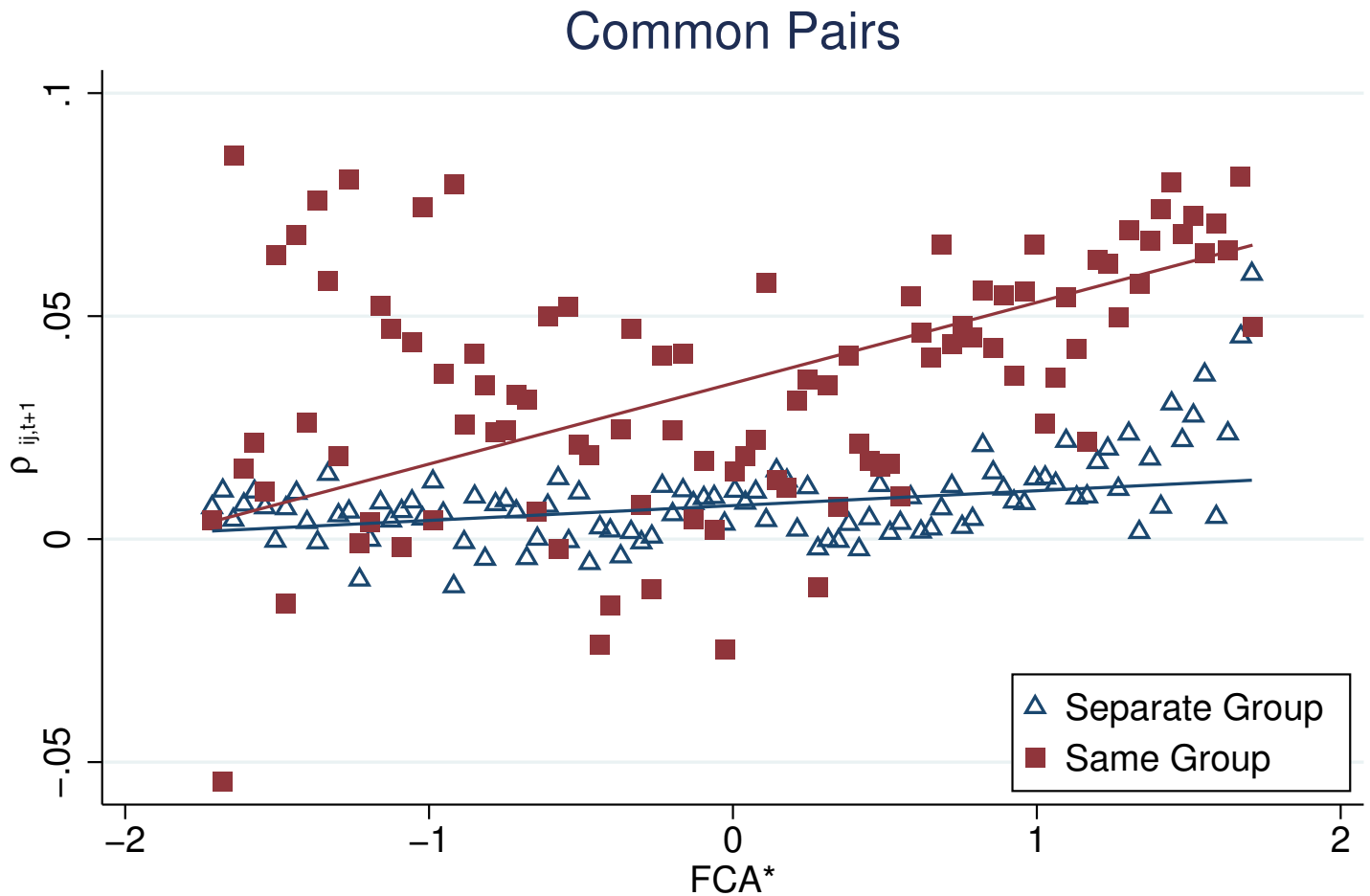
t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Monthly

Future Correlation via FCA^*

4 Factor + Industry (by Business Group)



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against normalized rank transformed of our measure of institutional connectedness.

Fama MacBeth Estimation

Fortnightly variables for subset of Same Business Group

	(1)	(2)	(3)	(4)	(5)	(6)
FCA*	0.0183***	-0.0127*	0.0100***	-0.00219	0.00842***	-0.00535
	(7.04)	(-2.13)	(5.21)	(-0.39)	(5.37)	(-0.98)
(FCA* > *Median*[FCA*]) × FCA*		0.0460***		0.0186*		0.0210*
		(4.63)		(2.08)		(2.53)
ActiveHolder			0.0162***	0.0149**	0.0188***	0.0174***
			(3.41)	(3.07)	(4.00)	(3.61)
SameIndustry			0.0336***	0.0333***	0.0330***	0.0327***
			(7.85)	(7.78)	(7.95)	(7.83)
Samesize			0.0340**	0.0318**		
			(3.17)	(3.03)		
SameBookToMarket			0.0609***	0.0605***		
			(5.97)	(5.90)		
Constant	0.0344***	0.0149**	0.0399***	0.0314***	0.104***	0.0941***
	(9.76)	(3.01)	(8.38)	(5.53)	(5.71)	(5.16)
Value	No	No	No	No	Yes	Yes
Interaction	No	No	No	No	Yes	Yes
N	103914	103914	103914	103914	103914	103914
r2	0.00281	0.00488	0.0390	0.0407	0.0494	0.0511

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Monthly

Fama MacBeth Estimation

Fortnightly variables for subset of Different Business Group

	(1)	(2)	(3)	(4)	(5)	(6)
FCA*	0.00422**	-0.00178	0.00194*	-0.00210	0.00172	-0.00290*
	(3.11)	(-1.37)	(1.98)	(-1.75)	(1.93)	(-2.26)
(FCA* > *Median*[FCA*]) × FCA*		0.0146***		0.00996***		0.0115***
		(4.22)		(3.48)		(3.82)
ActiveHolder			0.000676	0.000186	-0.000437	-0.00102
			(0.48)	(0.13)	(-0.30)	(-0.70)
SameIndustry			0.0238***	0.0231***	0.0211***	0.0202***
			(4.34)	(4.23)	(4.23)	(4.05)
Samesize			0.0217***	0.0217***		
			(3.94)	(3.94)		
SameBookToMarket			0.00482	0.00477		
			(1.49)	(1.48)		
Constant	0.00831***	0.00285	0.0124***	0.00886***	0.0240	0.0202
	(4.07)	(1.67)	(5.03)	(4.03)	(1.53)	(1.32)
Value	No	No	No	No	Yes	Yes
Interaction	No	No	No	No	Yes	Yes
N	509961	509961	509961	509961	509961	509961
r2	0.000490	0.000899	0.0120	0.0124	0.0148	0.0152

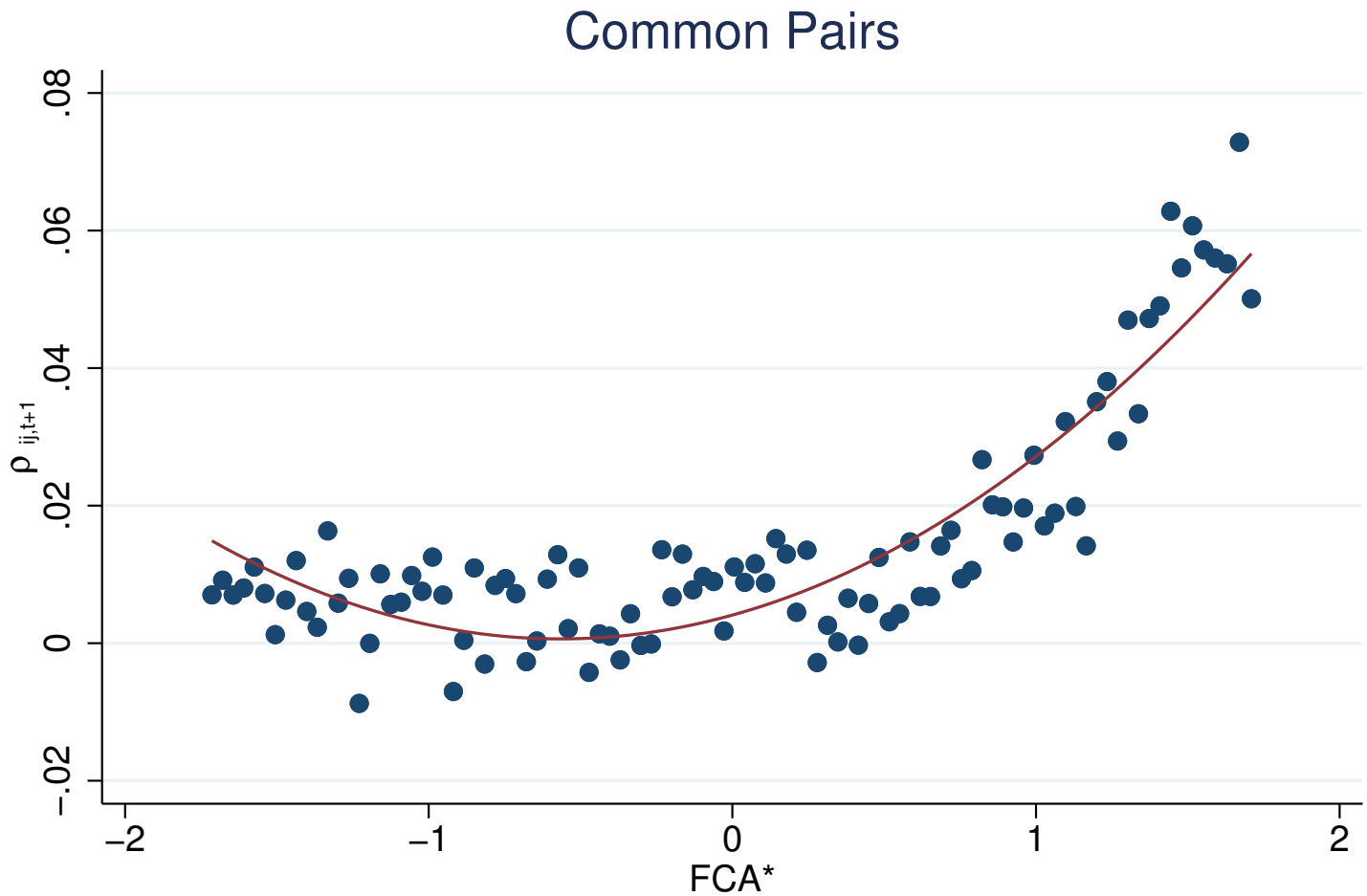
t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Monthly

4 Factor + Industry Future Correlation via *FCA**

Normalized Rank Transformed for each cross section (Fortnightly)



This figure graphs the correlation of daily 4Factor+Industry residuals in fortnight t+1 against our measure of institutional connectedness.

Monthly

Fama MacBeth Estimation

Fortnightly variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FCA*	0.0124***	0.0126***	0.0114***	0.0112***	0.00613***	0.00618***	0.00634***	0.00717***
	(7.43)	(7.54)	(8.09)	(7.90)	(8.02)	(7.89)	(8.12)	(7.01)
FCA*^{2}		0.0109***	0.0101***	0.00959***	0.00697***	0.00700***	0.00701***	0.00710***
		(10.30)	(10.52)	(10.08)	(9.59)	(9.97)	(9.37)	(8.49)
ρ_t			0.0737***	0.0736***	0.0711***	0.0709***	0.0712***	0.0724***
			(5.49)	(5.48)	(5.37)	(5.36)	(5.38)	(5.41)
ActiveHolder				0.00761***	0.00345	0.00331	0.00267	0.00336
				(4.62)	(1.84)	(1.84)	(1.40)	(1.90)
SameIndustry					0.0310***	0.0301***	0.0299***	0.0334***
					(7.85)	(7.57)	(7.40)	(7.46)
Samesize							0.0416***	0.0214***
							(3.66)	(3.91)
SameBookToMarket							0.0126**	0.0146***
							(3.19)	(4.29)
Constant	0.0150***	0.00429*	0.00372*	0.00224	0.0330**	0.0428**	0.0288***	0.0108***
	(6.31)	(2.35)	(2.24)	(1.35)	(2.82)	(2.85)	(3.52)	(4.76)
Value	No	No	No	No	Yes	Yes	No	No
Interaction	No	No	No	No	No	Yes	Yes	No
N	613875	613875	613875	613875	613875	613875	613875	613875
r2	0.00132	0.00215	0.0133	0.0136	0.0183	0.0191	0.0182	0.0162

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Monthly