Connected Stocks: Evidence from Tehran Stock Exchange

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Effects

Hypothesis 1

Simple measures of institutional connnectedness statistically and economically improve forecasts of cross-sectional variation in the correlation. The effect is stronger when pairs are in the same business groups

	Dependent Variable: Future Monthly Correlation of 4F+Industry Residuals								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FCA*	0.00320***	0.00235***			0.00154	0.00105	0.00103	0.000548	0.000948
	(4.05)	(3.90)			(1.73)	(1.51)	(1.12)	(0.80)	(1.37)
Same Group			0.0194***	0.0183***	0.0176***	0.0172***	0.0111***	0.00952**	0.00829*
			(9.72)	(6.03)	(7.15)	(5.09)	(3.53)	(2.73)	(2.25)
(FCA*) × SameGroup							0.00679*	0.00744**	0.00734**
							(2.41)	(3.32)	(3.30)
Observations	436735	434850	436735	434850	436735	434850	436735	434850	434850
Group Effect	No	No	No	No	No	No	No	No	Yes
Controls	No	Yes	No	Yes	No	Yes	No	Yes	Yes
R^2	0.000306	0.0360	0.000496	0.0363	0.000719	0.0364	0.000909	0.0366	0.0432

t statistics in parentheses

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

Hypothesis 2

Pairs of companies belonging to the same business group have a higher correlation than pairs not in the same group. In addition, Pairs that belong to the same group and have a common ownership co-move more than pairs that don't have common ownership.

Table 1: one of these tables

	Future Monthly Correlation of 4F+Industry Residuals					
	(1)	(2)	(3)	(4)	(5)	(6)
(FCA > $Median$[FCA])		-0.00168	-0.00337**	0.00855**		-0.00513***
		(-1.45)	(-2.89)	(2.76)		(-4.32)
SameGroup	0.0122***		0.0135***			0.00574*
	(5.81)		(6.48)			(2.02)
(FCA > $Median$[FCA]) × SameGroup						0.0181***
						(5.91)
FCA*					0.00174*	
					(2.43)	
Observations	5148109	5148109	5148109	76240	76240	5148109
Sub Sample	Total	Total	Total	SameGroups	SameGroups	Total
Controls	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.000455	0.000439	0.000485	0.0136	0.0135	0.000513

t statistics in parentheses

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

	Future Monthly Correlation of 4F+Industry Residuals					
	(1)	(2)	(3)	(4)	(5)	(6)
Common Ownership		-0.00350**	-0.00445***	0.00651*		-0.00527***
		(-3.30)	(-4.22)	(2.48)		(-4.72)
SameGroup	0.0122***		0.0140***			0.00607*
	(5.81)		(7.01)			(2.09)
Common Ownership × SameGroup						0.0157***
						(5.51)
FCA*					0.00174*	
					(2.43)	
Observations	5148109	5148109	5148109	76240	76240	5148109
Sub Sample	Total	Total	Total	SameGroups	SameGroups	Total
Controls	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.000455	0.000456	0.000504	0.0135	0.0135	0.000528

t statistics in parentheses

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

Hypothesis 3

Return of business group improve forecasts of cross-sectional variation in stocks' return.

	$\text{Return}_i - r_f = R_i$				
	(1)	(2)	(3)	(4)	(5)
R_M	0.216***	0.181***	0.124***	0.173***	0.118***
	(12.43)	(11.10)	(9.91)	(11.07)	(9.98)
$R_{Industry}$		0.119***	0.119***	0.130***	0.130***
		(6.41)	(6.41)	(7.62)	(7.62)
$R_{Businessgroup}$				0.0549***	0.0549***
				(14.81)	(14.81)
SMB			0.0194**		0.0193**
			(2.95)		(3.11)
UMD			0.00751		0.00681
			(1.31)		(1.27)
HML			0.0105*		0.0105*
			(1.98)		(2.22)
Constant	0.0155	-0.00383	-0.00387	-0.000620	-0.00107
	(0.66)	(-0.18)	(-0.39)	(-0.03)	(-0.11)
Observations	207552	207552	207552	207552	207552
R^2	0.000	0.054	0.054	0.133	0.133

t statistics in parentheses

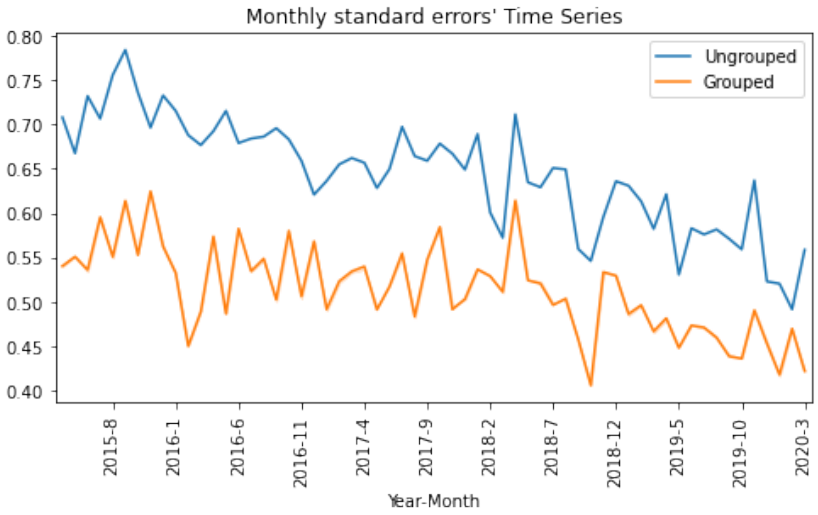
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Channels

Trading

For each firm, we calculate daily institutional imbalances, which is the net buying value of institutional investors relative to total trade on that day ($\text{InsImb} = \frac{\text{Buy}_{\text{value}} - \text{Sell}_{\text{value}}}{\text{Buy}_{\text{value}} + \text{Sell}_{\text{value}}}$). We expect that institutional imbalances have a lower variation in groups due to the correlated tradings that the ultimate owner ordered to do. So, we calculate the monthly standard deviation of the group's imbalances and compare them. As we expected grouped standard error is 13.1% lower with t-stat of 12.57 than ungrouped firms.

	count	mean	std	min	median	max
Ungrouped	60	0.645	0.063	0.492	0.653	0.784
Grouped	60	0.514	0.050	0.406	0.514	0.625



According to the main hypothesis, we need to compare comovement between pairs in groups with low standard error and other pairs. For this purpose, we define **Low Imbalance std** dummy for groups whose average standard errors are lower than half of the sample. So, this dummy is equal to one if at least one pair's firms belong to the low imbalance std business group.

	Future Monthly Corr. of 4F+Ind. Residuals						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FCA*	0.00116	0.00114	0.00106		0.00574*	0.00107	0.00154*
	(1.66)	(1.66)	(1.53)		(2.44)	(1.56)	(2.14)
Same Group	0.0165***	0.0166***	0.00974*	0.0108**		0.00977*	0.00850*
	(4.74)	(4.61)	(2.40)	(2.82)		(2.40)	(2.05)
Low Imbalance std		-0.000538	-0.00249	-0.00260	0.0222***	-0.00249	-0.00177
		(-0.48)	(-1.92)	(-1.97)	(5.40)	(-1.92)	(-0.54)
Low Imbalance std × SameGroup			0.0284***	0.0285***		0.0282***	0.0286***
			(5.95)	(6.00)		(4.09)	(3.99)
Low Imbalance std × SameGroup × FCA*						-0.000322	-0.000725
						(-0.06)	(-0.13)
Observations	434850	434850	434850	434850	38382	434850	434850
Group Effect	No	No	No	No	No	No	Yes
Sub-sample	Total	Total	Total	Total	Same Groups	Total	Total
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.0364	0.0366	0.0369	0.0367	0.0691	0.0370	0.0433

t statistics in parentheses

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

Furthermore, we should show that stocks in groups have a similar daily trading behavior. Accordingly, We estimate changes in firm's turnover on changes of turnover in market, industry, or business groups. we aggregate turnover by using weighted average of firms turnover in that day.

$$\Delta \text{TurnOver}_{i,t} = \ln(\frac{\text{TurnOver}_{i,t}}{\text{TurnOver}_{i,t-1}}) = \ln(\frac{\text{volume}_{i,t}}{\text{MarketCap}_{i,t}}) - \ln(\frac{\text{volume}_{i,t-1}}{\text{MarketCap}_{i,t-1}})$$

Table 2: Estimate regression for each stock across trading days

	Dependent Variable: $\Delta\text{TurnOver}_i$			
	(1)	(2)	(3)	(4)
$\Delta\text{TurnOver}_{\text{Market}}$	0.448***	0.387***	0.445***	0.353***
	(5.61)	(7.80)	(11.13)	(10.18)
$\Delta\text{TurnOver}_{\text{Group}}$		0.231**	0.234*	0.245***
		(2.67)	(2.07)	(8.22)
$\Delta\text{TurnOver}_{\text{Industry}}$	0.0993	-0.0558	-0.0970	0.0365
	(1.55)	(-0.61)	(-0.84)	(0.68)
$\ln(\text{size})_{i,t}$	-0.00571	-0.0136***	-0.0210**	-0.0119**
	(-0.03)	(-5.21)	(-3.06)	(-3.24)
Constant	-0.303	0.380***	0.610**	0.334**
	(-0.05)	(5.03)	(2.86)	(3.11)
Observations	293264	184699	184699	184699
Group Weight	-	MC × CR	MC	Equal
R^2	0.111	0.213	0.215	0.124

t statistics in parentheses

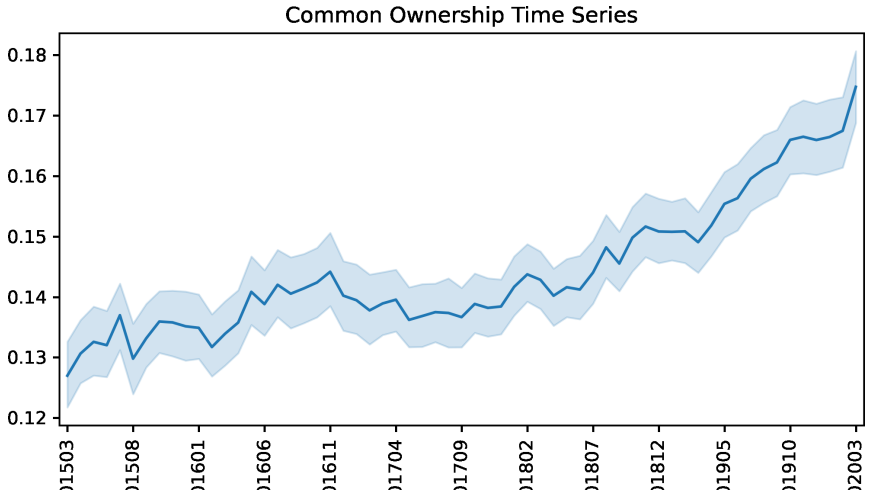
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

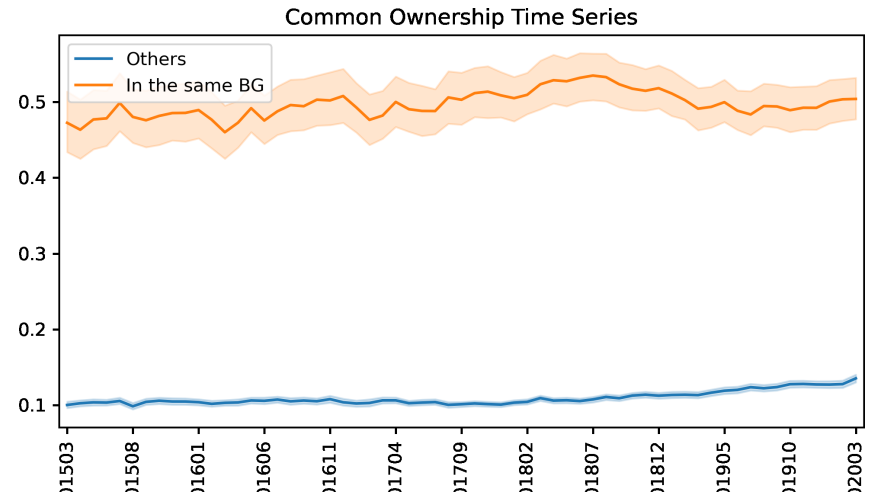
Table 3: Estimate regression for each stock across trading days

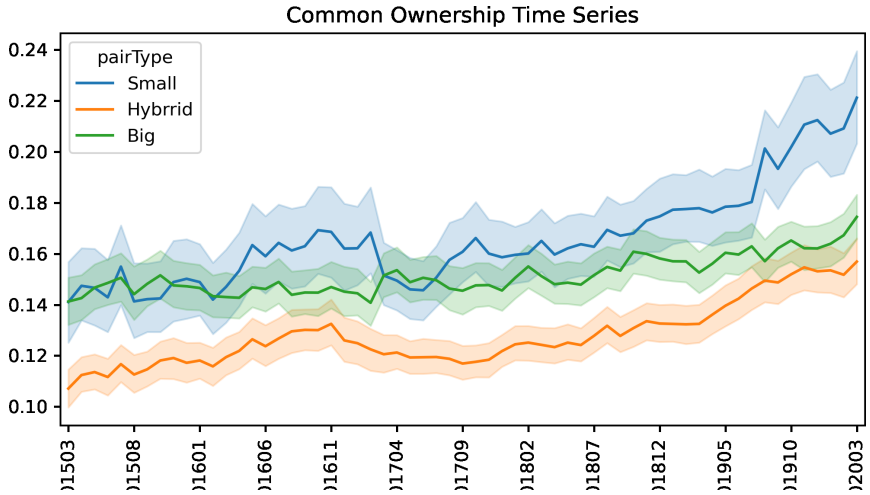
	Dependent Variable: ΔAmihud_i					
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta\text{Amihud}_{\text{Market}}$	0.324***	0.549*	0.373***	0.343***	0.391***	0.361***
	(6.46)	(2.23)	(13.09)	(12.01)	(13.09)	(12.14)
$\Delta\text{Amihud}_{\text{Group}}$			0.165**	0.153*	0.143*	0.129*
			(2.60)	(2.57)	(2.07)	(1.98)
$\Delta\text{Amihud}_{\text{Industry}}$	0.0567	0.121	-0.00390	-0.00670	-0.00322	-0.00430
	(1.21)	(1.36)	(-0.06)	(-0.10)	(-0.04)	(-0.06)
Observations	293264	291933	184699	183301	184699	183301
Weight	-	-	MC × CR	MC × CR	MC	MC
Control	No	Yes	No	Yes	No	Yes
R^2	0.0976	0.132	0.194	0.220	0.199	0.224

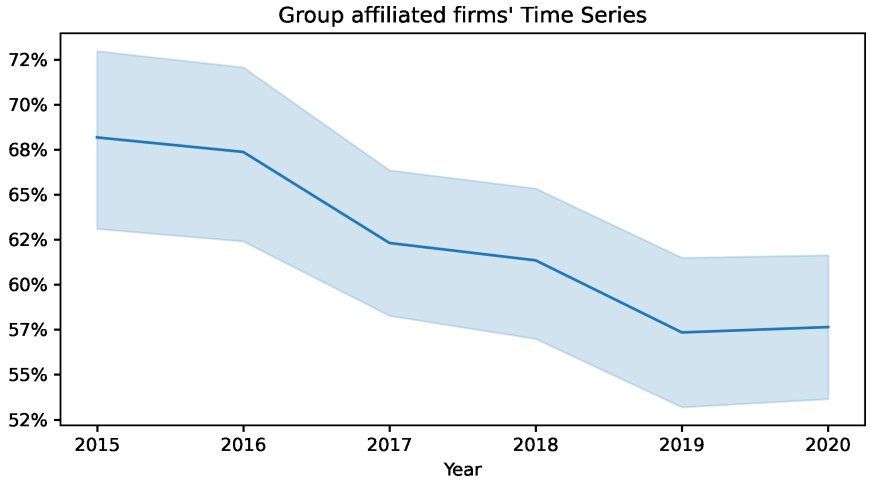
t statistics in parentheses

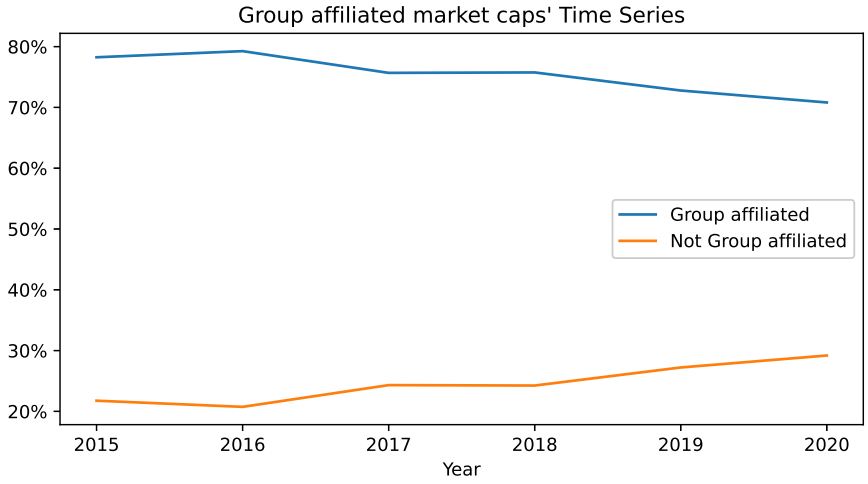
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

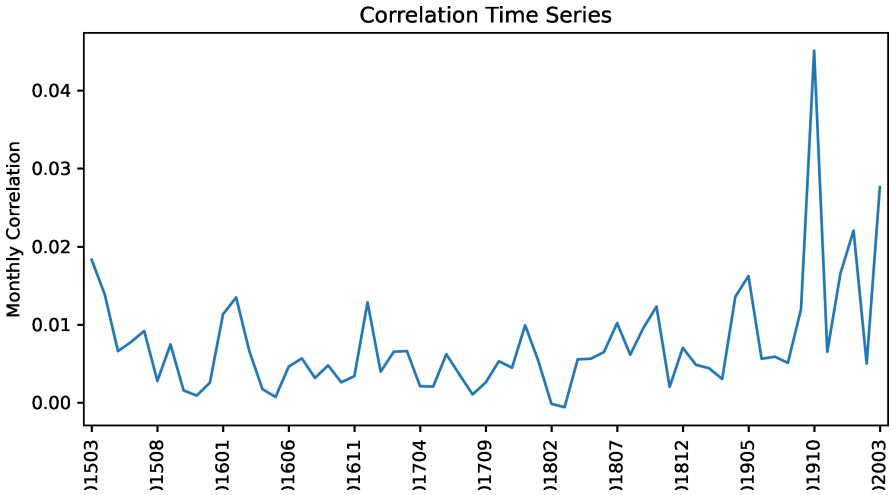

Common Ownership Time Series
0.18
0.17
0.16
0.15
0.14
0.13
0.12
)1503
)1508
)1601
)1606
)1611
)1704
)1709
)1802
)1807
)1812
)1905
)1910
)2003

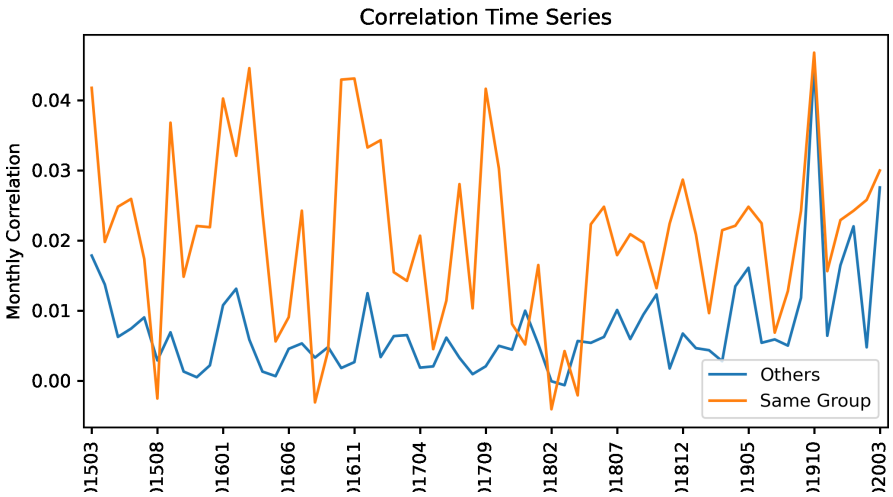

Common Ownership Time Series
Others
In the same BG
0.5
0.4
0.3
0.2
0.1
)1503
)1508
)1601
)1606
)1611
)1704
)1709
)1802
)1807
)1812
)1905
)1910
)2003


Common Ownership Time Series
pairType
Small
Hybrrid
Big
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
)1503
)1508
)1601
)1606
)1611
)1704
)1709
)1802
)1807
)1812
)1905
)1910
)2003


Group affiliated firms' Time Series
72%
70%
68%
65%
62%
60%
57%
55%
52%
2015
2016
2017
2018
2019
2020
Year


Group affiliated market caps' Time Series
80%
70%
60%
50%
40%
30%
20%
2015
2016
2017
2018
2019
2020
Year
Group affiliated
Not Group affiliated


Correlation Time Series
Monthly Correlation
0.04
0.03
0.02
0.01
0.00


Correlation Time Series
Monthly Correlation
0.04
0.03
0.02
0.01
0.00
Others
Same Group
1503
1508
1601
1606
1611
1704
1709
1802
1807
1812
1905
1910
2003