Institutional Ownership and Aggregate Volatility Risk

Alexander Barinov

Terry College of Business
University of Georgia

January 8, 2010

Institutions Prefer Medium Volatility

- Institutions dislike high idiosyncratic volatility (as well as uncertainty and disagreement)
  - Shleifer and Vishny (1997) argument - portfolio managers are underdiversified and face the probability of margin calls and fund outflows
- Institutions also dislike low IVol
  - Low IVol means high aggregate volatility risk
  - Institutions have comparative advantage in acquiring and processing information

IVol in IO/IVol Sorts - Table 2-B1

	Low	IVol2	IVol3	IVol4	High	H-L
Low	0.009	0.013	0.016	0.021	0.033	0.023
t-stat	*32.0*	*32.9*	*36.6*	*35.2*	*31.6*	*29.1*
Inst2	0.009	0.013	0.017	0.021	0.031	0.022
t-stat	*31.2*	*35.4*	*37.4*	*35.9*	*32.6*	*29.8*
Inst3	0.010	0.013	0.016	0.020	0.028	0.018
t-stat	*32.3*	*35.7*	*37.2*	*36.4*	*31.7*	*28.6*
Inst4	0.011	0.014	0.016	0.020	0.026	0.015
t-stat	*34.1*	*34.8*	*36.5*	*34.8*	*30.6*	*25.2*
High	0.012	0.014	0.016	0.019	0.026	0.014
t-stat	*33.7*	*33.5*	*35.3*	*34.1*	*29.8*	*23.9*
L-H	-0.002	-0.001	0.000	0.001	0.007	0.009
t-stat	*-19.6*	*-5.96*	*2.62*	*12.4*	*27.5*	*28.3*
1-5	-18%	-4%	2%	8%	28%	65%

IVol in IO/IVol Sorts - Table 2-B1

	Low	IVol2	IVol3	IVol4	High	H-L
Low	0.009	0.013	0.016	0.021	0.033	0.023
t-stat	*32.0*	*32.9*	*36.6*	*35.2*	*31.6*	*29.1*
Inst2	0.009	0.013	0.017	0.021	0.031	0.022
t-stat	*31.2*	*35.4*	*37.4*	*35.9*	*32.6*	*29.8*
Inst3	0.010	0.013	0.016	0.020	0.028	0.018
t-stat	*32.3*	*35.7*	*37.2*	*36.4*	*31.7*	*28.6*
Inst4	0.011	0.014	0.016	0.020	0.026	0.015
t-stat	*34.1*	*34.8*	*36.5*	*34.8*	*30.6*	*25.2*
High	0.012	0.014	0.016	0.019	0.026	0.014
t-stat	*33.7*	*33.5*	*35.3*	*34.1*	*29.8*	*23.9*
L-H	-0.002	-0.001	0.000	0.001	0.007	0.009
t-stat	*-19.6*	*-5.96*	*2.62*	*12.4*	*27.5*	*28.3*
1-5	-18%	-4%	2%	8%	28%	65%

IO and Anomalies

- Low IO firms include the two types of firms institutions flee - very low IVol and very high IVol
- It is not surprising that the relation between IVol and future returns is stronger for low IO firms
- Sorting on IVol in low IO subsample creates a larger IVol spread
- The story works if I replace IVol with MB, or Turnover, or Disagreement
- We already know aggregate volatility risk explains all these anomalies
- It should also explain why they are stronger for low IO firms

FVIX Betas in IO/IVol Sorts - T.2-B2

	Low	IVol2	IVol3	IVol4	High	H-L
Low	-0.771	-1.350	-1.100	-0.560	1.382	2.153
t-stat	*-4.81*	*-10.11*	*-7.71*	*-2.82*	*6.03*	*6.92*
Inst2	-0.888	-1.039	-1.023	-0.814	0.880	1.768
t-stat	*-6.86*	*-6.60*	*-5.13*	*-3.64*	*3.69*	*7.47*
Inst3	-1.258	-1.445	-1.331	-0.961	0.062	1.320
t-stat	*-8.71*	*-8.01*	*-8.00*	*-3.92*	*0.27*	*5.47*
Inst4	-1.401	-1.618	-1.612	-1.522	-0.620	0.781
t-stat	*-7.41*	*-9.15*	*-6.35*	*-4.78*	*-1.82*	*2.51*
High	-1.650	-1.685	-1.705	-1.809	-0.695	0.955
t-stat	*-7.84*	*-9.46*	*-7.09*	*-5.73*	*-2.16*	*2.69*
L-H	0.879	0.335	0.606	1.249	2.077	1.198
t-stat	*3.39*	*1.68*	*2.48*	*3.41*	*4.79*	*2.61*

FVIX Betas in IO/IVol Sorts - T.2-B2

	Low	IVol2	IVol3	IVol4	High	H-L
Low	-0.771	-1.350	-1.100	-0.560	1.382	2.153
t-stat	*-4.81*	*-10.11*	*-7.71*	*-2.82*	*6.03*	*6.92*
Inst2	-0.888	-1.039	-1.023	-0.814	0.880	1.768
t-stat	*-6.86*	*-6.60*	*-5.13*	*-3.64*	*3.69*	*7.47*
Inst3	-1.258	-1.445	-1.331	-0.961	0.062	1.320
t-stat	*-8.71*	*-8.01*	*-8.00*	*-3.92*	*0.27*	*5.47*
Inst4	-1.401	-1.618	-1.612	-1.522	-0.620	0.781
t-stat	*-7.41*	*-9.15*	*-6.35*	*-4.78*	*-1.82*	*2.51*
High	-1.650	-1.685	-1.705	-1.809	-0.695	0.955
t-stat	*-7.84*	*-9.46*	*-7.09*	*-5.73*	*-2.16*	*2.69*
L-H	0.879	0.335	0.606	1.249	2.077	1.198
t-stat	*3.39*	*1.68*	*2.48*	*3.41*	*4.79*	*2.61*

IO and Future Returns

- High IO firms have higher future returns (Gompers and Metrick, 2001) - stock picking ability?
- The link between IO and future returns is stronger for growth firms, small firms, etc.
- In high IVol subsample, institutions ignore the firms with the most positive FVIX betas
- Hence, going high IO minus low IO in high IVol subsample means high exposure to aggregate volatility risk
- In low IVol subsample, institutions should ignore firms with the most negative FVIX betas
- Hence, going high IO minus low IO in high IVol subsample means negative (or at least low) exposure to aggregate volatility risk

Institutional Ownership

- IO is for each stock is the sum of all institutional holdings from 13F over shares outstanding from CRSP
- Firms in the NYSE/AMEX bottom size quintile dropped
- If 13F holdings are missing, IO is set to 0
- I use Residual IO to control for the size effects, as in Nagel (2005)

$$log(\frac{IO}{1-IO}) = \gamma_0 + \gamma_1 \cdot log(Size) + \gamma_2 \cdot log^2(Size) + ResIO$$

FVIX Factor

- FVIX mimics daily changes in VIX
- The correlation between FVIX and the change in VIX is 0.53
- Negative FVIX beta is volatility risk (losing money when volatility increases)
- FVIX factor loses 1% per month, t-statistic -4.35 - FVIX hedges against volatility risk and has negative market beta
- CAPM alpha of FVIX is -56 bp per month, t-statistic -3.0

IO and Value Effect - Table 3A

	Low	Inst2	Inst3	Inst4	High	H-L
α_{CAPM}	1.516	1.048	1.019	0.937	0.936	0.581
t-stat	*3.71*	*3.36*	*3.26*	*3.23*	*2.88*	*2.27*
α_{ICAPM}	0.563	0.409	0.449	0.350	0.321	0.242
t-stat	*2.03*	*1.64*	*1.90*	*1.69*	*1.40*	*0.96*
β_{FVIX}	-1.690	-1.132	-1.011	-1.040	-1.090	-0.599
t-stat	*-6.67*	*-5.21*	*-6.68*	*-7.78*	*-8.09*	*-2.29*
α_{FF}	0.795	0.508	0.420	0.311	0.259	0.536
t-stat	*2.99*	*2.11*	*1.95*	*1.65*	*1.23*	*2.37*
α_{FF4}	0.556	0.378	0.423	0.284	0.198	0.358
t-stat	*2.22*	*1.53*	*1.85*	*1.52*	*0.98*	*1.59*
β_{FVIX}	-1.859	-1.013	0.020	-0.205	-0.477	-1.382
t-stat	*-4.10*	*-2.54*	*0.06*	*-0.48*	*-1.43*	*-2.31*

IO and IVol Discount - Table 3B

	Low	Inst2	Inst3	Inst4	High	H-L
α_{CAPM}	1.183	0.516	0.255	0.032	-0.045	1.228
t-stat	*3.06*	*1.61*	*0.88*	*0.12*	*-0.19*	*4.27*
α_{ICAPM}	0.087	-0.432	-0.665	-0.679	-0.594	0.681
t-stat	*0.32*	*-1.68*	*-2.61*	*-3.00*	*-2.49*	*3.60*
β_{FVIX}	-1.943	-1.679	-1.630	-1.260	-0.973	-0.969
t-stat	*-14.8*	*-12.6*	*-10.2*	*-13.3*	*-10.2*	*-8.59*
α_{FF}	0.644	0.078	-0.194	-0.285	-0.269	0.913
t-stat	*2.87*	*0.41*	*-1.16*	*-1.64*	*-1.45*	*4.55*
α_{FF4}	0.332	-0.196	-0.392	-0.405	-0.357	0.688
t-stat	*1.65*	*-1.14*	*-2.69*	*-2.56*	*-2.00*	*3.41*
β_{FVIX}	-2.426	-2.128	-1.543	-0.934	-0.681	-1.745
t-stat	*-7.20*	*-7.66*	*-5.38*	*-3.17*	*-2.30*	*-4.13*

IO and Turnover Effect - Table 3C

	Low	Inst2	Inst3	Inst4	High	H-L
α_{CAPM}	1.616	1.845	1.022	0.939	0.617	1.000
t-stat	*4.51*	*5.03*	*3.50*	*4.21*	*2.61*	*3.29*
α_{ICAPM}	0.713	0.998	0.325	0.521	0.249	0.464
t-stat	*2.87*	*3.90*	*1.61*	*2.86*	*1.27*	*1.89*
β_{FVIX}	-1.601	-1.501	-1.235	-0.740	-0.652	-0.949
t-stat	*-15.4*	*-11.4*	*-13.1*	*-5.41*	*-3.71*	*-5.08*
α_{FF}	1.049	1.327	0.543	0.582	0.250	0.799
t-stat	*3.97*	*4.82*	*2.69*	*3.12*	*1.30*	*3.10*
α_{FF4}	0.760	0.999	0.364	0.561	0.274	0.486
t-stat	*3.03*	*3.84*	*1.85*	*2.90*	*1.42*	*2.06*
β_{FVIX}	-2.247	-2.556	-1.391	-0.160	0.188	-2.435
t-stat	*-6.24*	*-5.41*	*-3.50*	*-0.41*	*0.48*	*-5.98*

IO and Disagreement Effect - T. 3D

	Low	Inst2	Inst3	Inst4	High	H-L
α_{CAPM}	1.096	0.643	0.547	0.595	0.631	0.465
t-stat	*3.61*	*2.51*	*2.31*	*2.88*	*2.68*	*1.83*
α_{ICAPM}	0.458	0.159	0.150	0.327	0.437	0.020
t-stat	*1.88*	*0.54*	*0.59*	*1.39*	*1.67*	*0.10*
β_{FVIX}	-1.131	-0.858	-0.703	-0.475	-0.343	-0.788
t-stat	*-7.91*	*-4.27*	*-5.48*	*-3.92*	*-2.10*	*-8.17*
α_{FF}	0.834	0.526	0.471	0.601	0.692	0.142
t-stat	*3.34*	*2.15*	*2.06*	*2.93*	*3.00*	*0.70*
α_{FF4}	0.466	0.236	0.230	0.387	0.547	-0.081
t-stat	*2.24*	*1.10*	*1.12*	*2.02*	*2.39*	*-0.38*
β_{FVIX}	-2.863	-2.254	-1.880	-1.663	-1.133	-1.730
t-stat	*-7.87*	*-5.23*	*-5.22*	*-5.81*	*-4.01*	*-4.30*

IO Effect is Not Skill - Table 4A

	Low	Inst2	Inst3	Inst4	High	H-L
α_{CAPM}	-0.318	-0.105	0.181	0.223	0.179	0.497
t-stat	*-1.79*	*-0.62*	*1.07*	*1.15*	*0.80*	*2.33*
α_{FF}	-0.250	-0.199	0.046	0.016	-0.003	0.247
t-stat	*-2.52*	*-2.65*	*0.58*	*0.17*	*-0.03*	*1.70*
α_{ICAPM}	0.067	0.095	0.284	0.243	0.209	0.142
t-stat	*0.36*	*0.50*	*1.54*	*1.23*	*0.97*	*1.10*
β_{FVIX}	0.682	0.354	0.182	0.035	0.053	-0.628
t-stat	*6.10*	*4.84*	*2.42*	*0.45*	*0.55*	*-4.99*
α_{FF4}	-0.156	-0.173	-0.024	-0.097	-0.169	-0.013
t-stat	*-1.59*	*-2.04*	*-0.31*	*-1.08*	*-1.63*	*-0.11*
β_{FVIX}	0.727	0.199	-0.547	-0.883	-1.293	-2.020
t-stat	*4.56*	*1.06*	*-3.26*	*-4.35*	*-7.94*	*-7.81*

IO Effect Explained - Table 4A

	Low	Inst2	Inst3	Inst4	High	H-L
α_{CAPM}	-0.318	-0.105	0.181	0.223	0.179	0.497
t-stat	*-1.79*	*-0.62*	*1.07*	*1.15*	*0.80*	*2.33*
α_{ICAPM}	0.067	0.095	0.284	0.243	0.209	0.142
t-stat	*0.36*	*0.50*	*1.54*	*1.23*	*0.97*	*1.10*
β_{FVIX}	0.682	0.354	0.182	0.035	0.053	-0.628
t-stat	*6.10*	*4.84*	*2.42*	*0.45*	*0.55*	*-4.99*
α_{FF}	-0.250	-0.199	0.046	0.016	-0.003	0.247
t-stat	*-2.52*	*-2.65*	*0.58*	*0.17*	*-0.03*	*1.70*
α_{FF4}	-0.156	-0.173	-0.024	-0.097	-0.169	-0.013
t-stat	*-1.59*	*-2.04*	*-0.31*	*-1.08*	*-1.63*	*-0.11*
β_{FVIX}	0.727	0.199	-0.547	-0.883	-1.293	-2.020
t-stat	*4.56*	*1.06*	*-3.26*	*-4.35*	*-7.94*	*-7.81*

IO Effect is Not Skill

- IO is positively related to future returns not because institutions buy the stocks that subsequently perform well
- Rather, they just ignore the stocks that subsequently perform poorly
- The difference in performance can be explained by aggregate volatility risk
- Stocks ignored by institutions have high IVol - hence low aggregate volatility risk and low expected return

IO Effect and MB - Table 5A

	Value	MB2	MB3	MB4	Growth	5-1
α_{CAPM}	0.354	0.444	0.474	0.525	0.935	0.581
t-stat	*2.01*	*2.29*	*2.74*	*2.47*	*4.05*	*2.27*
α_{ICAPM}	0.205	0.235	0.298	0.208	0.448	0.242
t-stat	*0.98*	*1.40*	*1.68*	*1.08*	*2.55*	*0.96*
β_{FVIX}	-0.263	-0.370	-0.313	-0.562	-0.863	-0.599
t-stat	*-1.74*	*-4.11*	*-3.07*	*-3.88*	*-5.01*	*-2.29*
α_{FF}	0.168	0.294	0.380	0.339	0.704	0.536
t-stat	*0.91*	*1.70*	*2.18*	*1.77*	*3.97*	*2.37*
α_{FF4}	0.066	0.112	0.193	0.118	0.424	0.358
t-stat	*0.35*	*0.69*	*1.15*	*0.64*	*2.20*	*1.59*
β_{FVIX}	-0.799	-1.419	-1.454	-1.719	-2.181	-1.382
t-stat	*-2.83*	*-6.57*	*-7.58*	*-6.18*	*-4.79*	*-2.31*

IO Effect and IVol - Table 5B

	Low	IVol2	IVol3	IVol4	High	5-1
α_{CAPM}	-0.053	-0.103	0.154	0.233	1.176	1.228
t-stat	*-0.37*	*-0.93*	*1.15*	*1.38*	*3.87*	*4.27*
α_{ICAPM}	-0.017	-0.122	0.106	0.108	0.664	0.681
t-stat	*-0.12*	*-1.17*	*0.83*	*0.81*	*3.47*	*3.60*
β_{FVIX}	0.062	-0.035	-0.085	-0.223	-0.907	-0.969
t-stat	*0.85*	*-0.58*	*-0.92*	*-2.58*	*-6.68*	*-8.59*
α_{FF}	-0.056	-0.146	0.079	0.154	0.857	0.913
t-stat	*-0.41*	*-1.41*	*0.67*	*1.08*	*3.94*	*4.55*
α_{FF4}	-0.171	-0.220	-0.023	-0.007	0.518	0.688
t-stat	*-1.35*	*-2.15*	*-0.21*	*-0.06*	*2.78*	*3.41*
β_{FVIX}	-0.895	-0.575	-0.792	-1.253	-2.641	-1.745
t-stat	*-4.48*	*-4.00*	*-3.95*	*-4.89*	*-7.81*	*-4.13*

IO Effect and Turnover - Table 5C

	Low	Turn2	Turn3	Turn4	High	5-1
α_{CAPM}	0.144	0.468	0.280	0.633	1.143	1.000
t-stat	*0.89*	*2.01*	*1.09*	*2.24*	*3.66*	*3.29*
α_{ICAPM}	0.095	0.191	-0.103	0.020	0.559	0.464
t-stat	*0.56*	*0.89*	*-0.42*	*0.09*	*2.78*	*1.89*
β_{FVIX}	-0.087	-0.490	-0.679	-1.087	-1.036	-0.949
t-stat	*-1.11*	*-4.69*	*-3.10*	*-6.32*	*-6.23*	*-5.08*
α_{FF}	0.011	0.215	0.037	0.255	0.810	0.799
t-stat	*0.08*	*0.98*	*0.16*	*1.18*	*3.53*	*3.10*
α_{FF4}	-0.040	0.002	-0.264	-0.069	0.446	0.486
t-stat	*-0.26*	*0.01*	*-1.26*	*-0.33*	*2.19*	*2.06*
β_{FVIX}	-0.397	-1.659	-2.342	-2.517	-2.832	-2.435
t-stat	*-2.41*	*-7.04*	*-6.84*	*-7.85*	*-7.03*	*-5.98*

IO Effect and Disagreement - T. 5D

	Low	Disp2	Disp3	Disp4	High	5-1
α_{CAPM}	-0.138	-0.148	0.139	-0.030	0.327	0.465
t-stat	*-0.85*	*-0.91*	*0.70*	*-0.12*	*1.15*	*1.83*
α_{ICAPM}	-0.233	-0.161	0.060	-0.297	-0.213	0.020
t-stat	*-1.60*	*-1.19*	*0.34*	*-1.52*	*-1.24*	*0.10*
β_{FVIX}	-0.169	-0.023	-0.141	-0.472	-0.957	-0.788
t-stat	*-1.57*	*-0.19*	*-1.04*	*-3.51*	*-8.85*	*-8.17*
α_{FF}	-0.176	-0.155	0.040	-0.242	-0.034	0.142
t-stat	*-1.14*	*-1.10*	*0.24*	*-1.23*	*-0.17*	*0.70*
α_{FF4}	-0.321	-0.303	-0.142	-0.481	-0.402	-0.081
t-stat	*-2.13*	*-2.24*	*-0.84*	*-2.62*	*-2.54*	*-0.38*
β_{FVIX}	-1.127	-1.152	-1.421	-1.853	-2.857	-1.730
t-stat	*-4.60*	*-4.91*	*-4.34*	*-4.45*	*-8.12*	*-4.30*

IO Effect and Uncertainty

- IO effect (almost) monotonically increases with uncertainty measures
- Are institutions more able to pick stocks with high uncertainty?
- Not likely - the result comes primarily from the deterioration in the performance of low IO stocks
- FVIX explains most of the increase of the IO effect with uncertainty

FVIX Betas in IO/IVol Sorts - T.2-B2

	Low	IVol2	IVol3	IVol4	High	H-L
Low	-0.771	-1.350	-1.100	-0.560	1.382	2.153
t-stat	*-4.81*	*-10.11*	*-7.71*	*-2.82*	*6.03*	*6.92*
Inst2	-0.888	-1.039	-1.023	-0.814	0.880	1.768
t-stat	*-6.86*	*-6.60*	*-5.13*	*-3.64*	*3.69*	*7.47*
Inst3	-1.258	-1.445	-1.331	-0.961	0.062	1.320
t-stat	*-8.71*	*-8.01*	*-8.00*	*-3.92*	*0.27*	*5.47*
Inst4	-1.401	-1.618	-1.612	-1.522	-0.620	0.781
t-stat	*-7.41*	*-9.15*	*-6.35*	*-4.78*	*-1.82*	*2.51*
High	-1.650	-1.685	-1.705	-1.809	-0.695	0.955
t-stat	*-7.84*	*-9.46*	*-7.09*	*-5.73*	*-2.16*	*2.69*
L-H	0.879	0.335	0.606	1.249	2.077	1.198
t-stat	*3.39*	*1.68*	*2.48*	*3.41*	*4.79*	*2.61*

ΔVIX instead of FVIX - Table 6

	$\beta^{CAPM}_{\Delta VIX}$	β^{CAPM}_{FVIX}	$\beta^{1f}_{\Delta VIX}$	β^{1f}_{FVIX}
Inst	-0.021	-0.416	-0.028	-0.146
t-stat	*-4.31*	*-5.58*	*-7.28*	*-9.67*
Inst MB	-0.014	-0.406	-0.021	-0.144
t-stat	*-1.65*	*-4.04*	*-2.74*	*-4.45*
Inst IVol	0.007	-0.742	0.063	0.317
t-stat	*0.49*	*-4.60*	*4.07*	*7.10*
Inst Turn	-0.071	-0.894	-0.011	0.254
t-stat	*-6.51*	*-6.86*	*-1.18*	*5.41*
Inst Disp	-0.035	-0.673	-0.001	0.114
t-stat	*-4.27*	*-8.01*	*-0.13*	*4.10*

Conditional CAPM Betas - Table 7

	Rec	Exp	Diff
Inst	0.120	-0.074	0.194
t-stat	*4.24*	*-1.92*	*4.33*
Inst MB	-0.066	-0.117	0.051
t-stat	*-4.49*	*-8.17*	*2.65*
Inst IVol	-0.142	-0.386	0.244
t-stat	*-6.57*	*-9.80*	*5.65*
Inst Turn	-0.024	-0.448	0.424
t-stat	*-0.47*	*-5.84*	*4.86*
Inst Disp	-0.041	-0.213	0.172
t-stat	*-2.91*	*-13.85*	*8.39*

Conclusion: IO and Anomalies

- Institutions prefer medium volatility (turnover, disagreement, market-to-book)
- Sorting on these variables in low IO group creates a larger spread in their values
- Hence, sorting on these variables in low IO group creates a larger spread in FVIX betas
- Controlling for aggregate volatility risk explains most of the link between the anomalies and IO
- The aggregate volatility risk story is supported by loadings on VIX changes and by conditional CAPM betas

Conclusion: IO Effect

- IO effect is not due to stock picking ability of institutions - all they do is avoid the future "losers"
- IO is negatively correlated with aggregate volatility risk, because on average institutions are averse to volatility
- Aggregate volatility increase also explains why IO effect is high when uncertainty is high
- Better stock picking in a volatile environment is not an explanation again - IO effect is high when uncertainty is high because low IO stocks have more negative alphas as uncertainty increases
- The aggregate volatility risk story is supported by loadings on VIX changes and by conditional CAPM betas