Firm Complexity and Conglomerates Expected Returns

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Complexity and Asset Prices

- Cohen and Lou (2012) find that conglomerates take one month longer to incorporate industry-level news

- In particular, returns to a pseudo-conglomerate that mimics the real conglomerate using single-segment firms, predict the conglomerate's returns

- Barinov, Park, and Yildizhan (2016) find that firm complexity can be used as a limits to arbitrage measure

- All else equal, more complex firms have stronger post-earnings-announcement drift

Disagreement, Short Sale Constraints, and Overpricing

- Miller (1977) argues that short sale constraints make stocks overpriced: pessimists are kept out of the market, and the stock price is the average valuation of the optimists

- Greater disagreement makes the overpricing worse, since optimists become more optimistic on average (pessimists become more pessimistic too, but they do not trade)

- Barinov, Park, and Yildizhan (2016) show that, holding all else fixed, conglomerates have lower analyst following, lower institutional ownership, less precise earnings forecasts

What Is New Here?

- The negative cross-sectional relation between uncertainty/disagreement and future returns is well-known

- Diether et al., 2002, look at analyst disagreement, Ang et al., 2006, look at idiosyncratic volatility

- Implied trading strategies call for shorting small, illiquid, distressed, volatile firms, and the alpha is visible for at most a year

- In contrast, conglomerates are relatively large, liquid, and not particularly volatile

- The complexity effect lasts for at least two years, and the underperformance of conglomerates persists for almost a decade

Measures of Complexity

- Conglomerate dummy (Conglo) - 1 if the firm has multiple segments, 0 otherwise

- Concentration (Comp) - our main variable, equals to 1-HHI, HHI (Herfindahl index) is based on segment sales

- Number of segments (NSeg) (based on 2-digit SIC codes)

- RSZ (Rajan, Servaes, Zingales, 2000) - coefficient of variation of imputed segment-level market-to-book ratios

Information Environment of Conglomerates

Table 2, Panel A. All Firms

Dep Var =	# An	# Spec	IO	Error	Disp
Comp	-27.60	-60.86	-15.08	21.78	15.30
t-stat	*-8.72*	*-13.8*	*-7.20*	*2.09*	*5.76*
Controls	YES	YES	YES	YES	YES

Table 2, Panel B. Conglomerates Only

Dep Var =	# An	# Spec	IO	Error	Disp
Comp	-33.53	-77.57	-19.22	30.17	17.00
t-stat	*-8.25*	*-13.3*	*-7.17*	*2.48*	*4.57*
Controls	YES	YES	YES	YES	YES

Complexity and Information Environment

- All else equal, more complex firms
  - Are followed by less analysts, especially analysts specializing in their core industry
  - Attract less institutional ownership
  - Have analysts that disagree more and make larger forecast errors

- The relation does not hold in univariate tests, but with size adjustment it does hold

- Comp variable has a large mass at zero (single-segment firms), so the relation could be just conglomerates vs. single-segments

- The larger slope on the Comp variable in the conglomerates only sample confirms complexity really matters

Complexity Sorts: Alphas

	Zero	Low	High	Z-H	Z-M	L-H
α_{FF5}	0.194	-0.009	-0.162	0.354	0.203	0.154
t-stat	*3.04*	*-0.17*	*-2.70*	*4.01*	*2.46*	*1.85*
$\alpha_{FF3+CMA}$	0.044	0.013	-0.075	0.119	0.031	0.090
t-stat	*0.64*	*0.26*	*-1.26*	*1.14*	*0.35*	*1.13*
$\alpha_{FF3+RMW}$	0.162	0.020	-0.115	0.276	0.142	0.136
t-stat	*2.75*	*0.37*	*-2.05*	*3.41*	*1.85*	*1.71*
$\alpha_{FF5+MOM}$	0.240	0.014	-0.114	0.353	0.226	0.129
t-stat	*3.50*	*0.29*	*-1.82*	*4.06*	*2.61*	*1.47*

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Complexity Sorts: Betas

	Zero	Low	High	Z-H	Z-M	L-H
β_{MKT}	0.962	1.004	1.084	-0.122	-0.042	-0.080
t-stat	*49.6*	*46.8*	*77.6*	*-4.61*	*-1.58*	*-3.25*
β_{SMB}	0.007	-0.047	-0.076	0.083	0.053	0.029
t-stat	*0.23*	*-1.91*	*-2.82*	*1.93*	*1.42*	*0.91*
β_{HML}	-0.096	-0.036	0.032	-0.128	-0.059	-0.067
t-stat	*-2.73*	*-0.98*	*0.96*	*-2.84*	*-1.26*	*-1.76*
β_{CMA}	-0.121	0.184	0.177	-0.298	-0.306	0.006
t-stat	*-2.09*	*2.84*	*3.34*	*-4.69*	*-4.59*	*0.08*
β_{RMW}	-0.309	0.117	0.174	-0.483	-0.426	-0.057
t-stat	*-7.17*	*3.09*	*3.94*	*-9.43*	*-8.00*	*-1.27*

Complexity Sorts

- High-complexity conglomerates trail single-segment firms by 35 bp per month (FF5 alphas)

- Key factor is RMW: conglomerates seem to be relatively profitable (compared to their size-MB-investment matches), but do not earn high returns of profitable firms

- Low-complexity firms also trail single-segment firms and beat high-complexity firms, though significance is weaker

Complexity Effect: Persistence

	Year 1	Year 2	Year 3	Year 4	Year 5
α_{FF5}^{Z-H}	0.354	0.275	0.329	0.335	0.299
t-stat	*4.01*	*2.78*	*3.42*	*3.32*	*3.10*
α_{FF5}^{Z-L}	0.203	0.149	0.283	0.282	0.284
t-stat	*2.46*	*1.76*	*3.64*	*3.58*	*3.59*
α_{FF5}^{L-H}	0.154	0.127	0.046	0.053	0.015
t-stat	*1.85*	*1.93*	*0.59*	*0.69*	*0.20*

Complexity Effect: Persistence

- High/low-complexity conglomerates continue to underperform for at least five years

- Most likely, this extreme persistence is because of extreme persistence of the conglomerate status

- Complexity per se affects returns for two years (14 bp times 24 months = 3.4% total effect)

Complexity Effect and Institutional Ownership

A3. RSZ Complexity Measure

	Zero	Low	High	Z-H
Low	0.297	-0.304	-0.296	0.594
t-stat	*2.99*	*-1.72*	*-3.51*	*4.49*
RInst2	0.214	-0.107	-0.214	0.429
t-stat	*2.86*	*-0.91*	*-2.22*	*3.43*
High	0.070	0.043	-0.028	0.097
t-stat	*0.81*	*0.40*	*-0.30*	*0.74*
L-H	-0.228	0.347	0.269	0.497
t-stat	*-1.94*	*1.65*	*2.17*	*3.11*

Complexity Effect and Idiosyncratic Volatility

B3. RSZ Complexity Measure

	Zero	Low	High	Z-H
Low	0.095	-0.021	-0.160	0.255
t-stat	*1.15*	*-0.26*	*-2.39*	*2.50*
IVol2	0.154	-0.130	-0.180	0.334
t-stat	*1.98*	*-1.11*	*-1.67*	*2.51*
High	-0.250	-0.745	-1.023	0.773
t-stat	*-1.61*	*-2.98*	*-3.35*	*2.15*
H-L	0.345	0.725	0.863	0.518
t-stat	*1.83*	*2.66*	*2.72*	*1.37*

Complexity Effect and Limits to Arbitrage

- Complexity effect is stronger if institutional ownership is low, consistent with Miller (1977) story

- Complexity effect is stronger if idiosyncratic volatility is high

- Complexity effect can reach 59-77 bp per month if limits to arbitrage are high

Complexity Effect at Earnings Announcements

Conglo	-0.086			
t-stat	*-3.00*			
Comp		-0.223		
t-stat		*-3.03*		
NSeg			-0.062	
t-stat			*-3.99*	
RSZ				-0.018
t-stat				*-4.55*
Controls	YES	YES	YES	YES

New Conglomerates

Conglo	-0.096	-0.101	-0.101
t-stat	*-2.20*	*-2.16*	*-2.01*
NewCong1	-0.354		
t-stat	*-2.45*		
NewCong2		-0.195	
t-stat		*-1.91*	
NewCong3			-0.213
t-stat			*-2.24*
Controls	YES	YES	YES

- Complexity effect is distinct from post-merger underperformance
- Post-merger underperformance can have an explanation a-la Miller (1977)

Other Uncertainty Effects

IVol	-6.144					-8.719
t-stat	*-2.02*					*-2.36*
AD		-0.356				-0.227
t-stat		*-4.39*				*-2.82*
Turn			-3.833			-0.526
t-stat			*-4.87*			*-0.65*
IO				-0.325		-0.403
t-stat				*-3.38*		*-0.75*
RSI					-9.437	
t-stat					*-6.48*	
Conglo	-0.115	-0.079	-0.124	-0.156	-0.211	-0.111
t-stat	*-3.00*	*-1.85*	*-3.08*	*-3.90*	*-3.55*	*-2.56*
Controls	YES	YES	YES	YES	YES	YES

Coinsurance Hypothesis

- Hann, Ogneva, and Ozbas (2013) show that conglomerates have lower implied cost of capital

- They argue this effect is risk-based because it is stronger for financially constrained firms and for conglomerates with lower correlation between segment cash flows

- Essentially, conglomeration implies coinsurance of the segments

Complexity Effect and Financial Constraints: Regression Slopes

A2. Whited-Wu Index

	Low	High	H-L
Comp	-0.116	-0.599	0.483
t-stat	*-1.24*	*-2.95*	*2.39*
Controls	YES	YES	YES

A3. Kaplan-Zingales Index

	Low	High	H-L
Comp	-0.461	-0.122	-0.339
t-stat	*-3.15*	*-0.79*	*-1.71*
Controls	YES	YES	YES

Complexity Effect and Coinsurance in Cross-Sectional Regressions

B1. Segment Correlation

	Low	High	H-L
HiComp	-0.258	-0.121	-0.137
t-stat	*-1.61*	*-1.71*	*-0.83*
Controls	YES	YES	YES

B2. Credit Rating

	IG	Junk	NR
Comp	-0.145	0.360	-0.557
t-stat	*-1.00*	*2.05*	*-3.48*
Controls	YES	YES	YES

Complexity Effect and Coinsurance Hypothesis

- Complexity effect is in realized equity returns, not in cost of capital implied by equity forecasts averaged with bond returns

- Whited-Wu and Kaplan-Zingales financial constraints measures disagree whether complexity effect is stronger for financially constrained firms

- Credit rating also delivers split message: complexity effect is stronger for non-rated firms (consistent with coinsurance hypothesis), but flips the sign for junk-rated firms (inconsistent)

- Cash flow correlation between segments is not related to complexity effect

Complexity Effect and Diversification Discount

- Complexity effect can be creating diversification discount (slow bleeding) or it can be viewed as "delayed" diversification discount

- Lamont and Polk show that deeper diversification discount implies higher expected return

- They find no difference in expected returns between conglomerates and single-segment firms, because they did not control for RMW

- Mitton and Vorkink (2010) hypothesize that skewness-loving investors dislike diversification (which destroys skewness) and require a higher rate of return from (some) conglomerates

Complexity Effect and Diversification Discount

DDisc	0.092	0.097	0.111
t-stat	*3.45*	*3.56*	*3.78*
HiComp	-0.108		
t-stat	*-1.78*		
HiSeg		-0.101	
t-stat		*-1.69*	
HiRSZ			-0.138
t-stat			*-2.03*
Controls	YES	YES	YES

- I confirm Lamont and Polk result, but find that it does not subsume complexity effect
- The regressions are for conglomerates only, showing that degree of complexity matters for expected returns

Complexity Effect and Idiosyncratic Skewness

C. Return Skewness Groups

	Low	High	H-L
Comp	-0.295	-0.351	-0.057
t-stat	*-2.46*	*-2.33*	*-0.38*
Controls	YES	YES	YES

- Complexity effect is unrelated to skewness and Mitton and Vorkink story

Conclusion

- Conglomerates are hard to value, which makes institutions and analysts abandon them
- The resulting disagreement coupled with short-sale constraints creates overpricing and subsequent negative alphas
- Complexity effect is around 35 bp per month (controlling for RMW)
- Expected return spread between single-segment firms and conglomerates lasts for at least 5 years
- Expected return spread between low and high complexity conglomerates lasts for 2 years
- Complexity effect can double if limits to arbitrage is high

Idiosyncratic Volatility Discount and Conglomerates

Single	Low	IVol2	IVol3	Ivol4	High	L-H
α_{FF5}	0.070	0.123	-0.156	0.130	-0.225	0.294
t-stat	*0.67*	*1.20*	*-1.40*	*1.06*	*-1.40*	*1.38*
Conglo	Low	IVol2	IVol3	Ivol4	High	L-H
α_{FF5}	-0.024	-0.152	-0.149	-0.269	-0.558	0.534
t-stat	*-0.39*	*-1.67*	*-1.64*	*-2.07*	*-2.48*	*2.13*

- IVol effect is stronger for conglomerates despite them being larger, more liquid, etc.
- The impact is primarily on the short side

Analyst Disagreement Effect and Conglomerates

Single	Low	Disp2	Disp3	Disp4	High	L-H
α_{FF5}	0.194	-0.113	0.067	0.187	-0.175	0.369
t-stat	*2.61*	*-1.25*	*0.58*	*1.31*	*-1.16*	*2.18*
Conglo	**Low**	**Disp2**	**Disp3**	**Disp4**	**High**	**L-H**
α_{FF5}	0.141	-0.222	-0.081	-0.020	-0.523	0.665
t-stat	*1.75*	*-2.17*	*-0.69*	*-0.13*	*-3.52*	*3.71*

- AD effect is stronger for conglomerates despite them being larger, more liquid, etc.
- The impact is primarily on the short side