Learning Externalities in Opaque Asset Markets:

Evidence from International Commercial Real Estate

Roland Füss Daniel Ruf

University of St.Gallen

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Motivation

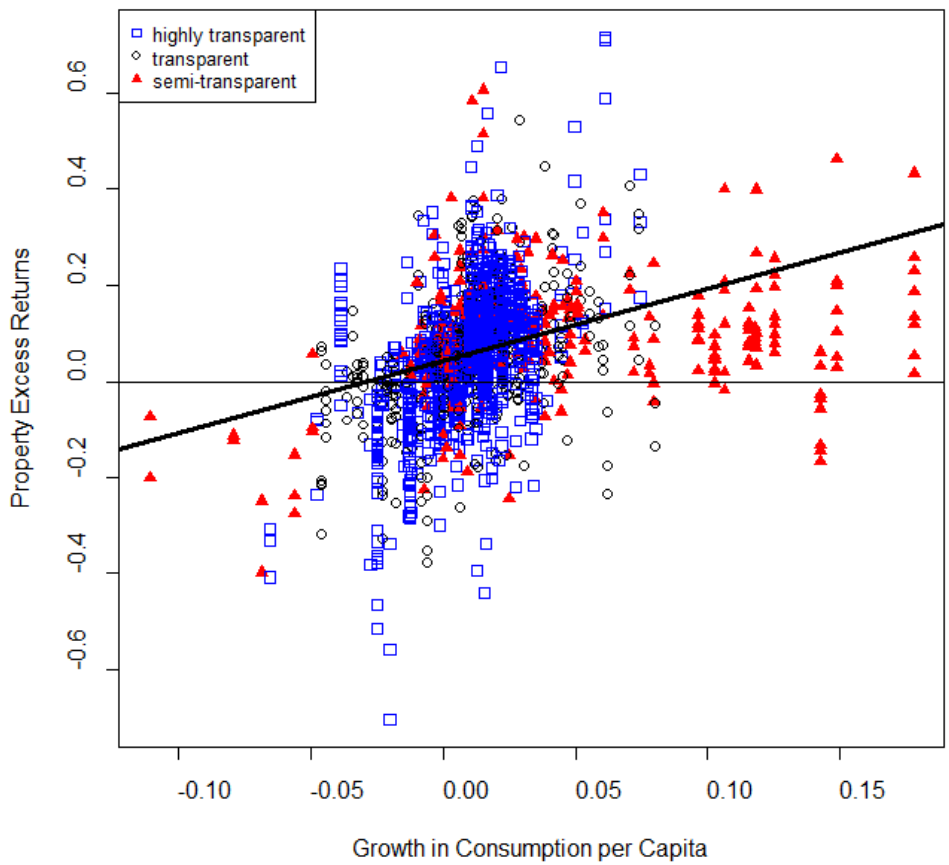
- International Commercial Real Estate Markets
  - immobile assets privately traded over-the-counter
  - property markets are geographically segmented
  - lack of transparency $\Rightarrow$ limited publicly available information
- Trading Barriers in Opaque Markets for Foreign Investors
  - trading with locally better informed dealers
  - market entry costs for large institutional investors
  - proximity in transparency $\uparrow \Rightarrow$ info acquisition costs $\downarrow$
- **Central Idea:**
  - transparency differentials $\Rightarrow$ cross-sectional dependence
  - estimate spillover effects (learning externalities)

Motivation

- Main Results
  - cross-sectional dependence of segmented property markets
  - co-movements in property market excess returns
  - dependence cannot be explained by global systematic risk
  - evidence of spillover effects and feedback loops

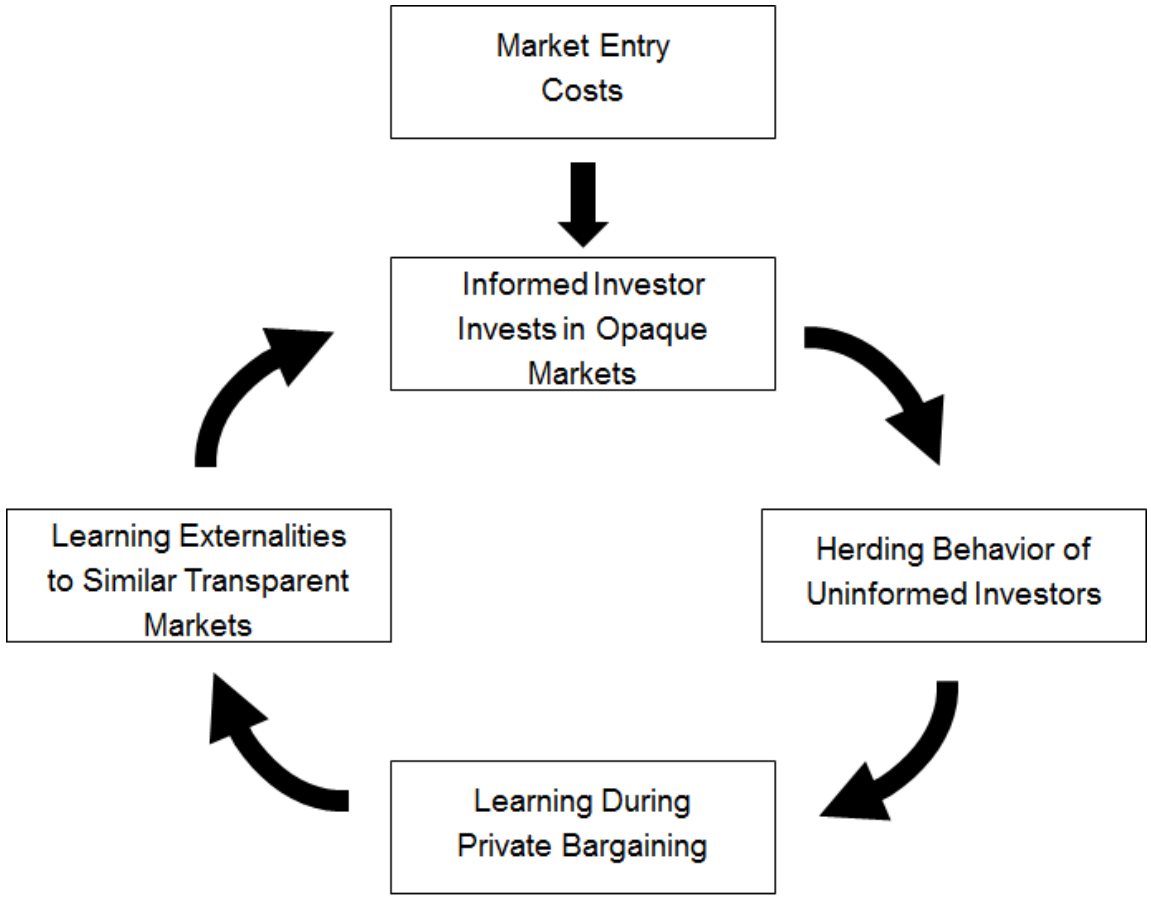
Economic Intuition

- Limited growth perspectives in liquid, mature private markets
- Comparative advantage of investor from opaque market to enter similarly transparent markets



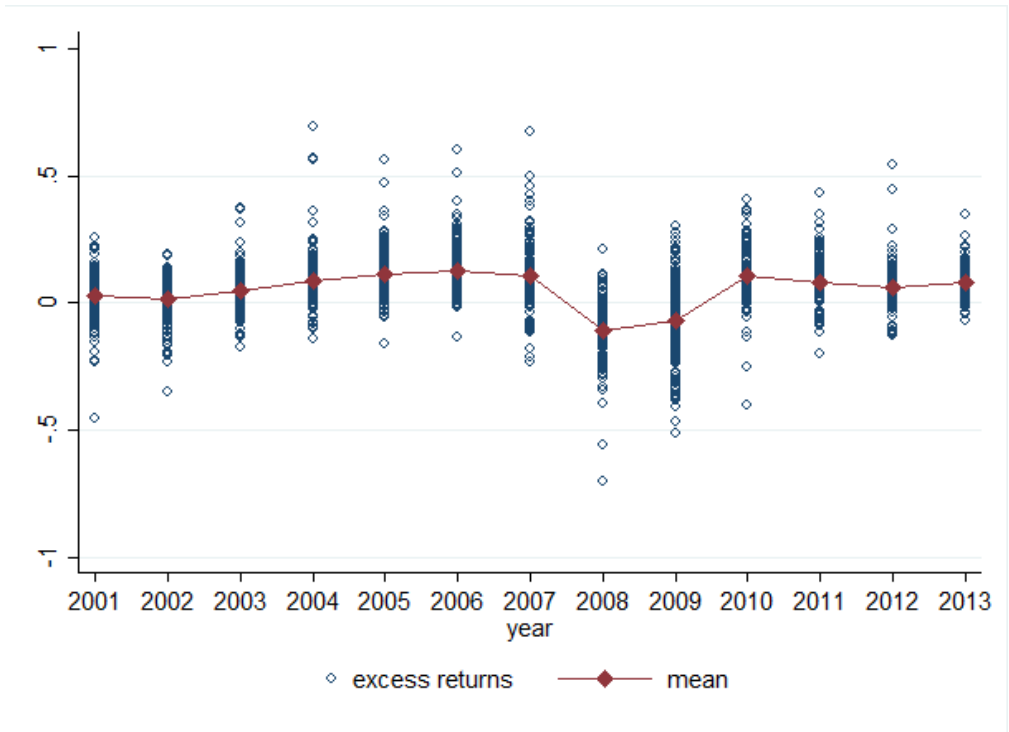
Economic Intuition

- Strategic interaction of informed and uninformed investors
- Learning externalities on markets with similar transparency



Data

- Exclusive Data from Property Market Analysis (PMA)
  - annual total market excess returns
  - three sectors: industrial, office, retail
  - city-level data of 26 countries (USA, Europe, Asia-Pacific)
  - sample period from 2001 to 2013



Econometric Model

- Spatial Model

$$Y_{nt} = \lambda W_{nt} Y_{nt} + X_{nt}\beta + \eta_n + \varepsilon_{nt}$$

  - time-varying $n \times n$ weighting matrix W_{nt}
  - spatial HAC-robust inference

- Weighting Matrix: Jones Lang LaSalle Transparency Index
  - proxy for legal requirements, regulation, info about market,...
  - inverse distance $w_{ij,t} = d_{ij,t}^{-1}$ between property markets i and j

  $\Rightarrow$ **Implication:** Δ transparency$_{ij} \downarrow \Rightarrow w_{ij} \uparrow \Rightarrow$ spillover effect$_{ij} \uparrow$

Empirical Results

- Cross-Sectional Dependence in Segmented Markets

	Model I	Model II	Model III	Model IV
SPATIAL LAG	0.557***	0.414**	0.620***	0.365**
	(0.137)	(0.173)	(0.118)	(0.172)
STOCK ER	0.073***	0.090***	0.075***	0.058**
	(0.024)	(0.028)	(0.025)	(0.023)
ΔCONSUMPTION	1.209***	1.296***	1.451***	1.305***
	(0.354)	(0.367)	(0.480)	(0.423)
ΔCPI	0.566**	0.423*	0.598*	0.308
	(0.252)	(0.252)	(0.346)	(0.341)
TERM SPREAD	0.298*	0.136	0.346	0.106
	(0.157)	(0.154)	(0.292)	(0.285)
REIT ER		0.019***		
		(0.007)		
U.S. CMBS SPREAD		0.033***		
		(0.012)		
ΔCONSTRUCTION			-0.420***	
			(0.143)	
INVESTMENT				0.085***
				(0.026)
Observations	2041	2041	880	880
Fixed-Effects	Yes	Yes	Yes	Yes
Pesaran CD	8.37***	6.73***	-0.14	0.08
Adj.-R^2	0.373	0.380	0.451	0.494

HAC s.e. *p<0.1; **p<0.05; ***p<0.01

Empirical Results

- Spillover Effects and Feedback Loops

	Model I	Model II	Model III	Model IV
Average Direct Impact				
STOCK ER	0.074	0.099	0.863	0.053
ΔCONSUMPTION	1.295***	1.337***	1.648***	1.366***
ΔCPI	0.609***	0.435**	0.682	0.297
TERM SPREAD	0.319	0.139*	0.385	0.109
REIT ER		0.017		
U.S. CMBS SPREAD		0.041		
ΔCONSTRUCTION			-0.471	
INVESTMENT				0.107
Average Total Impact				
STOCK ER	0.152	0.119	0.200	0.081
ΔCONSUMPTION	2.738***	2.213***	3.813***	2.081***
ΔCPI	1.285***	0.743**	1.577	0.452
TERM SPREAD	0.680	0.228*	0.891	0.167
REIT ER		0.058		
U.S. CMBS SPREAD		0.003		
ΔCONSTRUCTION			-1.089	
INVESTMENT				0.163
Average Indirect Impact				
STOCK ER	0.078	0.021	0.113	0.028
ΔCONSUMPTION	1.443**	0.875***	2.165***	0.714***
ΔCPI	0.676*	0.309	0.895	0.155
TERM SPREAD	0.361	0.088	0.506	0.057
REIT ER		-0.014		
U.S. CMBS SPREAD		0.017		
ΔCONSTRUCTION			-0.618	
INVESTMENT				0.056

Empirical Results

- Spatial Partitioning
  - Geometrically decaying spillovers of local shocks
  - Spatial multiplier effect

$$(I_n - \lambda W_{nt})^{-1} \approx I_n + \lambda W_{nt} + \lambda^2 W_{nt}^2 + \lambda^3 W_{nt}^3 + \ldots + \lambda^q W_{nt}^q$$

W-Order	DIRECT	INDIRECT	TOTAL
W^0	1.208	0.000	1.208
W^1	0.000	0.673	0.673
W^2	0.052	0.323	0.375
W^3	0.015	0.194	0.209
W^4	0.011	0.105	0.116
W^5	0.004	0.060	0.065
W^6	0.003	0.033	0.036
W^7	0.001	0.019	0.020
W^8	0.001	0.010	0.011
$\sum_{q=0}^{8} W^q$	1.295	1.417	2.713

AVERAGE IMPACT EFFECTS	DIRECT EFFECT	INDIRECT EFFECT	TOTAL EFFECT
ΔCONSUMPTION	1.295	1.443	2.738

Empirical Results

- Robustness Check
  - three estimators: GMM, 2SLS, NLS
  - test for global systematic risk: high Pesaran CD, low adj.-R^2
  - sector heterogeneity: industrial, office, retail
  - different data: International Property Databank (IPD)
  - different W-matrices: political risk, geographic distance,...

	Model I	**Model II**	**Model III**	**Model IV**	**Model V**	**Model VI**
W-Matrix	Economic Freedom	Corruption Perception	Political Risk	Country Risk	Geographic Distance	Ambiguity Aversion
SPATIAL LAG	0.694***	0.641***	0.630***	0.612***	-0.031	0.514***
	(0.108)	(0.083)	(0.066)	(0.080)	(0.367)	(0.072)
STOCK ER	0.054***	0.065***	0.064***	0.067***	0.157***	0.088***
	(0.028)	(0.017)	(0.015)	(0.017)	(0.056)	(0.013)
ΔCONSUMPTION	0.994***	1.306***	1.337***	1.291***	2.554***	1.653***
	(0.274)	(0.222)	(0.188)	(0.209)	(0.909)	(0.211)
ΔCPI	0.382	0.660***	0.697***	0.677***	1.114**	0.708***
	(0.233)	(0.245)	(0.242)	(0.245)	(0.472)	(0.247)
TERM SPREAD	0.261*	0.482***	0.484***	0.287	0.678**	0.801***
	(0.157)	(0.155)	(0.153)	(0.155)	(0.288)	(0.170)
Observations	2041	2041	2041	2041	2041	2041
Fixed-Effects	Yes	Yes	Yes	Yes	Yes	Yes
Pesaran CD	2.27**	4.02***	2.85***	4.03***	53.70***	16.83***
Adj.-R^2	0.405	0.368	0.371	0.343	0.284	0.346

HAC s.e. *p<0.1; **p<0.05; ***p<0.01

Conclusion

- Results
  - co-movements of segmented property markets
  - transparency differentials as transmission channel
- Implications
  - counter effect to diversification potentials
  - potential instability of international property markets
  - need to establish international transparency standards

Thank you for your attention!

Appendix: Empirical Results

- Global Systematic Risk: high Pesaran CD, low adj.-R^2

Systematic Factors	**Model I**	**Model II**	**Model III**	**Model IV**	**Model V**
GLOBAL STOCK ER	0.155***				
	(0.012)				
ΔGOBAL CONS.		0.038***			
		(0.004)			
TED SPREAD			-5.359***		
			(0.514)		
EURODOLLAR			1.099***	1.607***	
			(0.188)	(0.195)	
U.S. REIT ER				0.273***	0.060***
				(0.016)	(0.021)
U.S. CMBS SPREAD				0.053***	0.021***
				(0.008)	(0.007)
INVESTMENT					0.143***
					(0.012)
ΔREAL XR	-0.001	-0.054	-0.015	-0.031	-0.092**
	(0.041)	(0.042)	(0.038)	(0.038)	(0.039)
Observations	1980	1980	1980	1980	1852
Fixed-Effects	Yes	Yes	Yes	Yes	Yes
Pesaran CD	125.15***	140.67***	127.09***	49.12***	16.81***
Adj.-R^2	0.085	0.064	0.077	0.252	0.316

Clustered-robust s.e. *p<0.1; **p<0.05; ***p<0.01