

Macroeconomic risk factors and the role of mispriced credit in the returns from international real estate stocks

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Outline

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Part I: Background and objective

What are the factors that drive the returns on international real estate stocks?



References:

Eichholtz, Huisman, Koedijk and Schuin, 1998; Eichholtz and Huisman, 2001; Case, Goetzmann and Rouwenhorst, 1999; Ling and Naranjo, 2002; Bond, Karolyi and Sanders, 2003; Hamelink and Hoesli, 2004; Bardhan, Edelstein and Tsang, 2008

Why this study?

- ▶ This study is the first to examine the canonical influence of the risk factors proposed by the three major international asset pricing models
- ▶ We establish original evidence for the impact of mispriced credit exploited by firms on the time series of international real estate security returns
- ▶ Findings contribute to the question whether capital markets are efficient in processing information about the relationships between credit market conditions and firm behaviour
- ▶ Results enable investors to assess underpricing of credit exploited by firms, promoting more efficient investment decisions

Part II: Methodology

The baseline model

- ▶ Macro factors from international asset pricing models
 - ▶ Global market factor: MSCI World Market index
 - ▶ Common and residual foreign exchange rate components
 - ▶ Unexpected (US) inflation
- ▶ Real estate securities-specific factors
 - ▶ Residual country factor, orthogonalised from global market
 - ▶ Residual RE factor, orthogonalised from global & local market
- ▶ We estimate the following panel model

$$r_{jt} = \theta_0 + \theta_1 r_{wt} + \theta_2 r_{ct}^\perp + \theta_3 r_{et}^\perp + \theta_4 e_t + \theta_5 \lambda_t + \theta_6 i_t^{US} + \omega_{jt} \quad (1)$$

The role of mispriced credit

- ▶ Mispricing of bank credit can occur as a consequence of banker myopia or incentive distortions (limited liability, deposit insurance)
- ▶ Mispricing can manifest itself in the under-pricing of the put option in non-recourse loans
- ▶ If this option is under-valued, then firms have access to excessively cheap capital, which may also produce excess free cash flow
- ▶ Pavlov and Wachter (2009) develop a market-based symptom of underpricing: a negative correlation between changes in the default spread and firm returns
- ▶ We hypothesise that the exploitation of underpriced credit is inversely related to firm performance

The augmented model

- ▶ We calculate the underpricing symptom as

$$\rho_{jt} = \text{corr}(r_j, \Delta_c^D) \quad (2)$$

- ▶ where r_j contains monthly total returns on security j and Δ_c^D contains monthly changes in the default spread in j 's domicile c
- ▶ We specify the augmented asset pricing model as

$$\begin{aligned} r_{jt} = & \theta_0 + \theta_1 r_{wt} + \theta_2 r_{ct}^\perp + \theta_3 r_{et}^\perp + \theta_4 e_t + \theta_5 \lambda_t + \theta_6 i_t^{US} \\ & + \theta_7 L \cdot \rho_{jt}^- + \omega_{jt} \end{aligned} \quad (3)$$

- ▶ After flipping the sign, we expect a negative sign for the coefficient of the lagged underpricing variable $L \cdot \rho_{jt}^-$

Additional control variables

- ▶ Debt to equity ratio (semi-annual)
- ▶ Firm size (log of market capitalisation)
- ▶ REIT status (as many countries introduced REIT regime, make change in legislation explicit)
- ▶ Country-level governance (World Bank world-wide governance indicators aggregated into equally weighted average per country and year)
- ▶ Year and country fixed effects to capture latent shocks

Part III: Data set

Data set

- ▶ Estimate global panel model for the sample:
 - ▶ 585 firms from 20 countries
 - ▶ Initial sample of $> 60,000$ firm-month observations
- ▶ Data sources:
 - ▶ *SNL, Datastream, EPRA/NAREIT*
 - ▶ IMF, World Bank, Global Financial Data
- ▶ Study period: 1999-2011, sub-periods for robustness
- ▶ US-investor perspective (choice of risk free rate, US\$ denoted returns, US inflation)

Characteristics of the sample, full study period (1999-2011)

Country	Firms	Mean market cap.	Mean return	Median return	S.D.	N
Australia	29	2456.294	-0.443	0.824	13.008	2970
Austria	7	976.743	-0.863	0.245	12.355	703
Belgium	12	543.632	0.394	0.577	5.265	1386
Canada	43	863.933	0.886	1.077	11.797	4502
Finland	3	558.458	0.284	0.386	9.002	400
France	25	2337.066	0.452	0.408	10.771	3117
Germany	27	407.706	-1.087	0.000	9.583	1970
Italy	5	932.551	-1.953	-0.308	17.460	543
Japan	42	2797.452	-0.144	0.243	11.146	3519
Netherlands	8	1339.411	-0.618	0.000	11.585	952
New Zealand	3	525.231	0.630	0.687	4.063	313
Norway	3	853.528	-0.566	-0.303	10.921	230
Poland	2	1224.319	0.160	0.000	10.796	239
Singapore	44	1462.337	0.176	0.367	11.380	3915
Spain	8	2319.543	-1.063	-0.389	15.507	834
Sweden	13	944.921	0.273	1.180	12.403	1438
USA	164	2156.313	0.509	1.147	12.423	19097
UK	93	906.800	-0.795	0.000	13.672	8721
Total	585	1512.357	0.057	0.523	13.485	60261

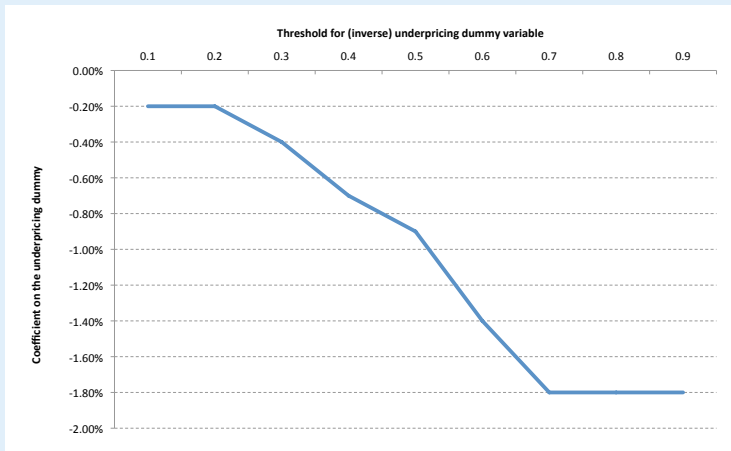
Part IV: Empirical results

Empirical results for global firm panel, full study period (1999-2011)

Variable	Global panel	IV panel	Residual UPRIC	UPRIC Dummy
MSCI	1.002***	1.036***	1.002***	0.992***
CTRY	0.558***	1.317***	0.567***	0.567***
RERES	0.683***	0.684***	0.685***	0.684***
FXRES	-0.278	-0.295	-0.284	-0.376**
FXCOM	0.416***	0.539***	0.414***	0.389***
USIN	1.323***	1.481***	1.350***	1.275***
Governance	-0.029*	-0.022	-0.033**	-0.026*
DE Ratio	-0.000	-0.000	-0.000	-0.000
LN Firm size	0.004***	0.004***	0.004***	0.004***
REIT status	0.005***	0.005***	0.005***	0.005***
L.UPRIC	-0.005**			
Residual UPRIC			-0.004**	
UPRIC dummy				-0.002*
Constant	0.023	0.017	0.030	0.018
Observations	40,806	40,806	39,872	41,451
R-squared	0.3088	0.286	0.3086	0.3049
Year dummies	Yes	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes	Yes
Firm clusters	566	566	565	571

Significance is indicated as: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Marginal reduction of return increases in degree of exploitation of mispriced debt



Could these findings be driven by alternative explanations?

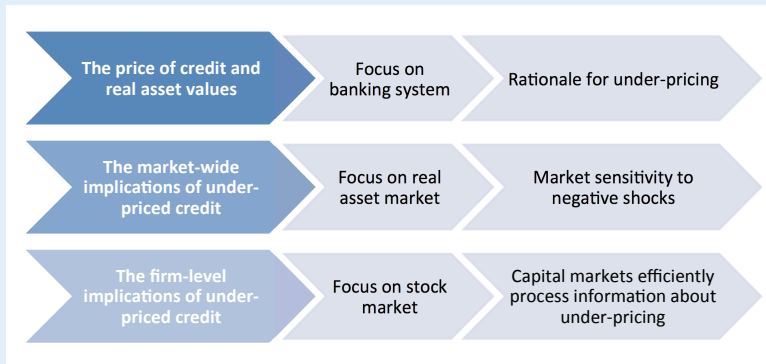
- ▶ Our results are robust to:
 - ▶ Controlling for the cost of debt
 - ▶ Impact of business cycle
 - ▶ Controlling for firm momentum
 - ▶ Controlling for investment behaviour
- ▶ Falsification tests:
 - ▶ Our findings should be specific to real estate - no significance in non-RE stocks
 - ▶ Caution: Maturity and size of real estate market may play a role in limiting this phenomenon

Part V: Conclusion and future work

Summary of key findings

- ▶ International real estate securities returns strongly correlate with global stock market
- ▶ Residual country and real estate effects prevail, suggesting benefits of diversification in an international portfolio
- ▶ International real estate stocks correlate with currency fluctuations and provide a hedge against US inflation
- ▶ Observable measure of mispriced credit in local economies inversely affects future firm performance: equity markets are efficient
- ▶ Investors are able to assess exploitation of underpriced credit and consider this factor in capital allocation decisions

The wider context of this paper and future work



Extension

But what are the implications for corporate financial policy?

Extension: Corporate financing policy

- ▶ The recent real estate bubble was arguably facilitated by the ready availability of low-cost debt underwritten at ever-increasing loan-to-value ratios, as investors, real estate investment firm managers and lenders alike fell victim to irrational optimism.
- ▶ If this story is true, then sustained increases in leverage reflect irrational optimism among real estate investment firm managers and may thus be used as a signal of sentiment worth monitoring to identify the build-up of an asset price bubble.
- ▶ We show that this rationale needs to take into account the incentives to managerial borrowing decisions induced by the fact that real estate debt is often collateralised against specific assets.

Progress to date

- ▶ We derive an empirically testable hypothesis that there is a rational strategy for pessimistic managers to increase leverage substantially when they expect a significant correction in the prices of these assets, in an attempt to salvage equity while keeping the rest of the firm's asset base shielded from the effects of declining asset values in some sectors.
- ▶ We find empirical evidence consistent with our hypothesis in a sample of listed US real estate firms and plan to explore implications for managers, investors and macro-prudential policy makers.