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Before and after the Global Financial Crisis Capital structure comparison of European property companies

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"Thirty seven years and hundreds of papers after Modigliani and Miller's seminal work, what do we really know about corporate capital structure choice? Theory has clearly made some progress on the subject. (...) However very little is known about the empirical relevance of the different theories"

RAJAN and ZINGALES (1995), Journal of Finance

The optimal capital structure and its determinants have long been debated in the corporate finance literature:

- many different theories... but empirical evidence does not fully support any model*
- literature has rarely surveyed the real estate sector*
- impact of the Global Financial Crisis*

Research questions

- 1. Which theoretical model (TOT or POT) better fits observed capital structures of real estate companies?*
- 2. Are capital structure determinants different for REITs and Non-REITs?*
- 3. How the same factors have acted before and after the Global Financial Crisis?*

Trade-off Theory

Optimal capital structure balances benefits and costs of debt:

- Advantages: financial discipline, tax shields
- Disadvantages: loss of flexibility (under investment problem, asset substitution, excessive cash payments to shareholders), costs of financial distress



It fails to explain why more profitable firms are less levered, stock markets react negatively to leverage-decreasing announcements, firms frequently issue debt, but rarely issue equity

Pecking order Theory

- Managers know the firm's prospects better than investors
- Investors perceive issuance of stock as a negative signal
- Issuing equity is costly



*Firms prefer using internally generated funds
... if more funds are needed they issue debt and ...
equity as a last choice
There is not target debt-equity ratio*

Real Estate industry peculiarities

- There is a parallel market for the assets held in the portfolio
 - Easily used as collaterals
- REITs are regulated, so...
 - tax shield effect are nearly eliminated
 - The presence of a high proportion of debt in the capital structure of REITs is thus somewhat inconsistent with the TOT.
 - distribution requirements
 - According to the POT, the management of a company should prefer debt over external financing and internal financial resources over debt. However, the earning distribution requirement of REITs extremely limits management discretion in major financing decisions.
 - As a consequence, there might be no overvaluation mispricing behind management decision to issue new shares. If investors were all well aware of this, information asymmetry would represent a less relevant problem for this type of companies.

Expected effects according to TOT and POT

	TOT	POT	
SIZE	+	-	SIZE
PROFITABILITY	+	-	
GROWTH	-	+(-)	
COST OF DEBT			
OWNERSHIP		-	
RISK	-	-	

Great explanatory power by both the TOT and POT

- TOT
 - larger firms are better able to diversify so that they have cash flows that are less susceptible to change and hence reduce the potential for the rise of bankruptcy costs
- POT
 - larger firms are more easily watched by external actors

Expected effects according to TOT and POT

	TOT	POT	
SIZE	+	-	
PROFITABILITY	+	-	PROFITABILITY
GROWTH	-	+(-)	
COST OF DEBT			
OWNERSHIP		-	
RISK	-	-	

The majority of studies do not agree on the direction of the relation

- TOT
 - a more profitable firm has got more earnings to shield
 - but in the case of market values, firm value is expected to increase as a consequence of an increase in profitability, so that leverage measured as the ratio of debt over equity should be reduced
- POT
 - a profitable firm will have greater resources to invest, so avoiding costs associated with information asymmetry (no need to raise debt and equity)
 - in the case of REITs, the requirement that the majority of earnings has to be distributed to shareholders implies that, despite the absence of the tax shield effect, whenever a REIT is faced with a positive NPV opportunity it may prefer to finance it with debt

Expected effects according to TOT and POT

	TOT	POT	
SIZE	+	-	
PROFITABILITY	+	-	
GROWTH	-	+(-)	GROWTH
COST OF DEBT			
OWNERSHIP		-	
RISK	-	-	

- TOT
 - management of firms with growth (positive investment) opportunities is less likely to invest money in risky or unrelated business activities
 - debt has a smaller disciplining, so smaller benefits
- POT
 - + Many studies have found positive relation for REITs (they prefer to raise fund through debt)
 - - high-growth firms have retained lower earnings than the amount of money required to undertake any positive investments they may face, so they prefer to use debt only a second-best choice after internal cash resources according to the TOT
 - - if firms are sufficiently optimistic that the future will bring even more promising opportunities, they may want not to use debt now so that in the future they will be able to avoid issuing new equity

Expected effects according to TOT and POT

	TOT	POT	
SIZE	+	-	
PROFITABILITY	+	-	
GROWTH	-	+(-)	
COST OF DEBT			COST OF DEBT
OWNERSHIP		-	
RISK	-	-	

- Traditionally, cost of debt has not been taken into consideration by either the POT or TOT
- when the price (interest rates) for a good (debt) rises, the demand for that good should be diminishing

Expected effects according to TOT and POT

	TOT	POT	
SIZE	+	-	
PROFITABILITY	+	-	
GROWTH	-	+(-)	
COST OF DEBT			
OWNERSHIP		-	OWNERSHIP
RISK	-	-	

The effect that the ownership composition of a company can have on its capital structure has not been originally considered by either the TOT or the POT

- POT
 - a negative relation between the presence of block holders and the amount of leverage of a firm may be predicted by using the reasoning behind the POT: the management of a company is inclined to act opportunistically, but if there are block-holders, they are able to organize and exert the same monitoring that lenders generally employ
 - The general conclusion could be that even if the POT can help make predictions about the capital structure, empirical evidence is mixed.
 - Hort *et al.* (2002) and Bathala *et al.* (1994) employing respectively UK and US samples, found similar evidences: companies with large institutional block holders were less leveraged than companies where the number of free floating shares was higher.
 - The same result was evidenced by Capozza and Seguin (2003) for the REIT subsector.
 - On the other side, Firth (1995) found opposite results
 - Omet (2004) found no direct relations between the presence of block holders and the level of debt in a company.

Expected effects according to TOT and POT

	TOT	POT
SIZE	+	-
PROFITABILITY	+	-
GROWTH	-	+(-)
COST OF DEBT		
OWNERSHIP		-
RISK	-	-

RISK

- TOT
 - as risk increases, so do the likelihood of bankruptcy and as a consequence the level of interest rates that lenders require
- POT
 - higher risk will be associated with an increased requirement of information by lenders to reduce information asymmetry with the company's insiders thus making management reluctant to issue new debt

Data sample

- Companies in the **EPRA/NAREIT Europe Index**
- 68 companies continuously part of the index:
 - **36 Real Estate Companies - REC**
 - **32 Real Estate Investment Trusts - REIT**
- **556 Observations** from 2003-2012
- Preference for **market** vs. **book** values

Data sample: statistical description

Leverage ratio REC	Mean	Median	Min.	Max.	SD	Leverage ratio REIT	Mean	Median	Min.	Max.	SD
<i>Book value ratios</i>						<i>Book value ratios</i>					
Total debt/total equity	1.481	1.277	0.268	5.381	0.966	Total debt/total equity	1.063	0.943	0.132	3.403	0.770
Total debt/total asset	0.475	0.507	0.001	0.816	0.163	Total debt/total asset	0.421	0.434	0.115	0.661	0.128
Total liabilities/total asset	0.596	0.621	0.243	0.849	0.130	Total liabilities/total asset	0.488	0.508	0.127	0.801	0.148
Total debt/capital (debt + equity)	0.549	0.561	0.211	0.843	0.147	Total debt/capital (debt + equity)	0.464	0.485	0.117	0.773	0.155
Short-term debt/total debt	0.197	0.167	0.009	0.738	0.166	Short-term debt/total debt	0.122	0.126	0.000	0.417	0.113
Long-term debt/total debt	0.822	0.849	0.262	1.000	0.168	Long-term debt/total debt	0.890	0.921	0.583	1.000	0.113
Short-term debt/total asset	0.098	0.073	0.003	0.413	0.090	Short-term debt/total asset	0.058	0.036	0.000	0.204	0.059
Long-term debt/total asset	0.399	0.386	0.106	0.628	0.140	Long-term debt/total asset	0.368	0.362	0.094	0.557	0.108
EBIT/interest expenses	3.304	2.295	-2.355	28.240	5.568	EBIT/interest expenses	3.200	1.644	-7.365	36.063	6.699
<i>Market value ratios</i>						<i>Market value ratios</i>					
Total debt/total equity (MV)	2.308	1.937	0.259	13.407	2.302	Total debt/total equity (MV)	1.079	1.015	0.206	3.084	0.620
Total debt/capital (debt + equity)	0.616	0.659	0.206	0.931	0.170	Total debt/capital (debt + equity)	0.483	0.504	0.171	0.755	0.136

Methodology

- **Panel regression model**

$$\begin{aligned} LEVERAGE_i = & \alpha + \beta_1 SIZE_{it} + \beta_2 PROFITABILITY_{it} + \beta_3 GROWTH_{it} + \beta_4 COST_{it} \\ & + \beta_5 OWNERSHIP_{it} + \beta_6 RISK_{it} + \beta_7 TYPE_{it} + \beta_8 CRISIS_{it} + u_{it} \end{aligned}$$

$i = 1,2,3 \dots$ cross – sectional units (companies)

$t = 1,2,3 \dots$ observation year

- **Controls**

- **Multicollinearity**

- Pearson Correlation Coefficients, Klein's test

- **Heteroskedasticity**

- White's test
- White Heteroskedasticity-Consistent Variances Standard Errors Test
- Newey-West HAC Standard Errors and Covariance

- **Normal distribution of residuals**

- Jarque-Bera test

- **Error independence**

- Graphical spatial distribution

Variables

$$LEVERAGE = \frac{Total\ Debt_{book\ value}}{(Equity_{market\ value} + Total\ Debt_{book\ value})}$$

$$SIZE = \ln (Total\ Assets_{book\ value})$$

$$OWNERSHIP = 1 - \% \text{ Of Floating Shares}$$

$$PROFITABILITY = \frac{EBIT}{Total\ Assets_{book\ value}}$$

$$RISK = \beta_u = \frac{\beta_l}{\left[1 + (1 - t) \times \frac{D}{E}\right]}$$

$$GROWTH = \frac{Equity_{market\ value}}{Equity_{book\ value}}$$

$$COST\ OF\ DEBT = \frac{Interest\ on\ Debt}{Total\ Debt_{Book\ Value}}$$

$$REIT = 0 \text{ for RECs, } 1 \text{ for REITs}$$

$$CRISIS = 0 \text{ for } 2003 - 2007 \text{ observations} \\ 1 \text{ for } 2008 - 2012 \text{ observations}$$

Results

Which theoretical model (TOT or POT) better fits observed capital structures of real estate companies?

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0966	0.1413	0.6836	0.4946
SIZE	0.0291	0.0064	4.5085	0.0000
PROFITABILITY	-0.5262	0.1038	-5.0695	0.0000
GROWTH	-0.0836	0.0149	-5.6235	0.0000
COST_OF_DEBT	-1.4321	0.3570	-4.0111	0.0001
OWNERSHIP	-0.0242	0.0299	-0.8084	0.4192
RISK	-0.0023	0.0068	-0.3422	0.7323
TYPE	-0.1296	0.0139	-9.3385	0.0000
CRISIS	0.0444	0.0165	2.6878	0.0074
R-squared	0.2954	Adjusted R-squared	0.2846	
F-statistic	27.2046	Prob(F-statistic)	0.0000	

Results: Size

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0966	0.1413	0.6836	0.4946
SIZE	0.0291	0.0064	4.5085	0.0000
PROFITABILITY	-0.5262	0.1038	-5.0695	0.0000
GROWTH	-0.0836	0.0149	-5.6235	0.0000
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CRISIS	0.0444	0.0165	2.6878	0.0074
R-squared	0.2954	Adjusted R-squared	0.2846	
F-statistic	27.2046	Prob(F-statistic)	0.0000	

	TOT	PET
Size	+	-
Profitability	+	-
Growth	-	+(-)
Cost of debt		
Ownership		-
Risk	-	-

- larger firms are perceived by lenders as being safer
- economies of scale: larger firms are better able to sustain the costs associated with debt issuing such as going to the debt market

Results: Profitability

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0966	0.1413	0.6836	0.4946
SIZE	0.0291	0.0064	4.5085	0.0000
PROFITABILITY	-0.5262	0.1038	-5.0695	0.0000
GROWTH	-0.0836	0.0149	-5.6235	0.0000
COST_OF_DEBT	-1.4321	0.3570	-4.0111	0.0001
OWNERSHIP	-0.0242	0.0299	-0.8084	0.4192
RISK	-0.0023	0.0068	-0.3422	0.7323
TYPE	-0.1296	0.0139	-9.3385	0.0000
CRISIS	0.0444	0.0165	2.6878	0.0074
R-squared	0.2954	Adjusted R-squared	0.2846	
F-statistic	27.2046	Prob(F-statistic)	0.0000	

	TOT	PET
Size	+	-
Profitability	+	-
Growth	-	+(-)
Cost of debt		
Ownership		-
Risk	-	-

- POT companies prefer to use internal cash resources and as long as they have more of them available → the more they are profitable, the less they are leveraged
- Rajan and Zingales (1995) clearly shows negative relation, even if the value of the coefficient was very different on country-to-country analyses

Results: Growth

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0966	0.1413	0.6836	0.4946
SIZE	0.0291	0.0064	4.5085	0.0000
PROFITABILITY	-0.5262	0.1038	-5.0695	0.0000
GROWTH	-0.0836	0.0149	-5.6235	0.0000
COST_OF_DEBT	-1.4321	0.3570	-4.0111	0.0001
OWNERSHIP	-0.0242	0.0299	-0.8084	0.4192
RISK	-0.0023	0.0068	-0.3422	0.7323
TYPE	-0.1296	0.0139	-9.3385	0.0000
CRISIS	0.0444	0.0165	2.6878	0.0074
R-squared	0.2954	Adjusted R-squared	0.2846	
F-statistic	27.2046	Prob(F-statistic)	0.0000	

	TOT	PET
Size	+	-
Profitability	+	-
Growth	-	+(-)
Cost of debt		
Ownership		-
Risk	-	-

- Generally speaking, in periods of hot equity, i.e. when the market-to-book value of a firm is higher, managers should be willing to exploit such conditions and hence prefer equity over debt reducing dramatically the level of leverage of their firms
- Many studies have claimed the existence of a negative relation: Barclay and Smith (2006), Long and Malitz (1985), Smith and Watts (1992), Bradley, Jarrell and Kim (1984)

Results: Cost of Debt

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.0966	0.1413	0.6836	0.4946
SIZE	0.0291	0.0064	4.5085	0.0000
PROFITABILITY	-0.5262	0.1038	-5.0695	0.0000
GROWTH	-0.0836	0.0149	-5.6235	0.0000
COST_OF_DEBT	-1.4321	0.3570	-4.0111	0.0001
OWNERSHIP	-0.0242	0.0299	-0.8084	0.4192
RISK	-0.0023	0.0068	-0.3422	0.7323
TYPE	-0.1296	0.0139	-9.3385	0.0000
CRISIS	0.0444	0.0165	2.6878	0.0074
R-squared	0.2954	Adjusted R-squared	0.2846	
F-statistic	27.2046	Prob(F-statistic)	0.0000	

	TOT	PET
Size	+	-
Profitability	+	-
Growth	-	+(-)
Cost of debt		
Ownership		-
Risk	-	-

- This result is in line with what could be expected
- Oii (1999) found substantial empirical results to claim that firms try to forecast the future level of prevailing interest rates and then set a target leverage ratio
- McCue and Kling (1994) studied the impact of major macroeconomics variables on real estate return and found that the level of nominal interest rates had the greatest impact

Conclusions – Q 1

Which theoretical model (TOT or POT) better fits observed capital structures of real estate companies?

TOT & POT explain some the effects on LEVERAGE

- **Trade-Off Theory**
 - **SIZE**: larger companies diversify, are safer and hence bankruptcy costs are lower
 - **GROWTH**: with investment opportunities debt does not present the benefits of its disciplining role because management is less likely to make sub-optimal investment choices
- **Pecking Order Theory**
 - **PROFITABILITY**: when firms have retained earnings they use them up before debt
 - **OWNERSHIP**: the presence of blockholders limits management use of debt for risk-taking activities

Results: RECs & REITs

	2003-2012					
	Comprehensive		REC Subsample		REIT Subsample	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
C	0,0966	0,4946	0,3283	0,1128	-0,1659	0,3981
SIZE	0,0291	0,0000	0,0203	0,0323	0,0321	0,0005
PROFITABILITY	-0,5262	0,0000	-0,7615	0,0000	-0,4022	0,0029
GROWTH	-0,0836	0,0000	-0,0953	0,0000	-0,0606	0,0161
COST_OF_DEBT	-1,4321	0,0001	-1,7131	0,0000	-0,4532	0,5517
OWNERSHIP	-0,0242	0,4192	-0,0697	0,0905	0,0216	0,6305
RISK	-0,0023	0,7323	0,0062	0,4740	-0,0095	0,3830
TYPE	-0,1296	0,0000				
CRISIS	0,0444	0,0074	0,0543	0,0111	0,0260	0,3260

Conclusions – Q 2

Are capital structure determinants different for REITs and Non-REITs?

- Higher LTV for RECs
- Not significant differences in signs

Results: Before & Post GFC

	2003-2012		Before GFC 2003-2007		Post GFC 2008-2012	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
C	0,0966	0,4946	0,3124	0,0765	-0,0808	0,7032
SIZE	0,0291	0,0000	0,0208	0,0099	0,0361	0,0002
PROFITABILITY	-0,5262	0,0000	-0,9491	0,0000	-0,2753	0,0346
GROWTH	-0,0836	0,0000	-0,0692	0,0002	-0,0902	0,0001
COST_OF_DEBT	-1,4321	0,0001	-2,4086	0,0000	0,6719	0,3080
OWNERSHIP	-0,0242	0,4192	0,0077	0,8399	-0,0258	0,5660
RISK	-0,0023	0,7323	0,0113	0,1741	-0,0133	0,2064
TYPE	-0,1296	0,0000	-0,0904	0,0000	-0,1459	0,0000
CRISIS	0,0444	0,0074				

Q 3 Results: Before & Post GFC

How the same factors have acted before and after the Global Financial Crisis?

	2003-2012		Before GFC 2003-2007		Post GFC 2008-2012	
	Coeff.	Prob.	Coeff.	Prob.	Coeff.	Prob.
C	0,0966	0,4946	0,3124	0,0765	-0,0808	0,7032
SIZE	0,0291	0,0000	0,0208	0,0099	0,0361	0,0002
PROFITABILITY	-0,5262	0,0000	-0,9491	0,0000	-0,2753	0,0346
GROWTH	-0,0836	0,0000	-0,0692	0,0002	-0,0902	0,0001
COST_OF_DEBT	-1,4321	0,0001	-2,4086	0,0000	0,6719	0,3080
OWNERSHIP	-0,0242	0,4192	0,0077	0,8399	-0,0258	0,5660
RISK	-0,0023	0,7323	0,0113	0,1741	-0,0133	0,2064
TYPE	-0,1296	0,0000	-0,0904	0,0000	-0,1459	0,0000
CRISIS	0,0444	0,0074				

- The **GFC** has affected the capital structure of real estate firms: the sample companies have been more leveraged since 2007
- *Some variables exhibit a different relation with LEVERAGE before and after:*
 - **SIZE**: during period of financial distress only the largest companies can get significantly higher debt
 - **PROFITABILITY**: constantly negative
 - *BGFC* a more profitable firm could afford to not use debt
 - *PGFC* a drop in profitability may have caused to use more debt also for more profitable firms

Thank You!



Please, email me for a full copy of the paper

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