Does Financial Reporting Quality affect Firm-Level Investments? Evidence from Shocks to Collateral Values

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Conference theme – Uncertainty and Risk

How does my paper relate to the theme?

- We look at firms that experience an exogenous shock to the value of their real estate assets.
- This increases uncertainty and affects the firm's external financing capacity and the ability to invest.
- We then investigate how reporting quality mitigates the adverse consequences of the increase in uncertainty with respect to investment.

What we do

We use state-level variation in real estate prices to proxy for shock to collateral values and external financing capacity.

We examine the consequences of collateral shocks:

(i) Firms with higher reporting quality "suffer less" from the shock;

(ii) Firms respond to the shock by changing their disclosure policy.

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Hypotheses

- Our hypotheses build on three findings:

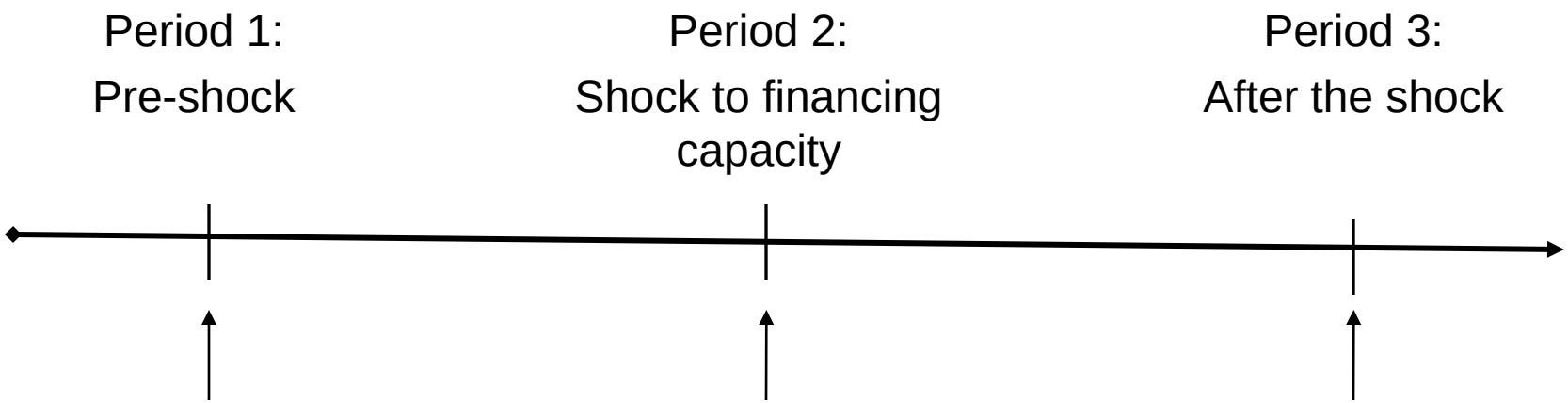
(i) Information asymmetry affects financing, and therefore investment (Myers and Majluf, 1984).

(ii) Collateralizable assets mitigate information asymmetry problems and facilitate investment (Chaney et al., 2009).

(iii) Financial reporting quality also mitigates information asymmetry problems (Biddle et al., 2009).

- We explain the hypotheses using a three-period example.

Hypotheses: Three-period example



Firm chooses level of reporting quality

FRQ: "exogenous"

Firms have lower financing capacity - pass up projects due to higher financing costs.

FRQ substitutes for collateral

H_1: Firms with higher FRQ will "suffer less"

Firms respond with increases to level of disclosure

H_2: Firms increase DQ after decrease in financing capacity

Hypotheses

H1: A change in collateral value has a lower impact on investment for firms with higher reporting quality.

H2: An increase (decrease) in collateral value is negatively (positively) associated with future corporate disclosure.

Research Design: Shocks to financing capacity

- When collateral value falls, investment also falls (Chaney et al., 2009; Gan, 2007).

- We use state-level real estate prices as proxies for the change in the value of firm real estate assets.
  - Exogenous shocks to firms' financing capacity.
  - Real estate is an important source of collateral.
  - Collateralizable assets increase financing capacity by providing a source of borrowing.

Measuring Real Estate Assets
An example - IBM

Step 1:

Fiscal Year 1993 data:

Property, Plant, and Equipment for Buildings at Cost = $13,314

Accumulated Depreciation for Buildings = $6,553

Proportion of Buildings Used = $6,553 / $13,314 = 0.492

Age = 40 * Proportion Used = 19.68

Purchase_year = 1993 – age = 1974

Step 2:

Book Value of Real Estate = Buildings at Cost + Construction in Progress at Cost + Land and Improvements at Cost = $14,736

Step 3:

Market Value of Real Estate as of 1993

= RE_total * (HPI_1993/HPI_1975) * (CPI_1975/CPI_purchase_yr)

= RE_total * (HPI_1993/HPI_1975) * (CPI_1975/CPI_1974)

= $58,291

Step 4:

Track fluctuations of the market value of real estate due to fluctuations in state-level prices. Study the effect of the change in market value on investment.

Chaney et al. model

$$\tilde{INV}_{it} = \beta_1 RE\_\tilde{Value}_{it} + \gamma_1 STATE\_\tilde{INDEX}_{st} + \sum_{j=1}^{J} \chi_j \tilde{X}_{jit-1} + \varepsilon_{it}$$

- *INV* is capital expenditures scaled by lagged PPE,
- *RE_Value* is the current market value of real estate assets scaled by lagged PPE.
- $STATE\_INDEX_{st}$ is a control for the growth in real estate prices in state s from 1993 to year t,
- *X* is a vector of *j* control variables (measured as of t-1)
- "~" indicates that the variable is adjusted for its firm mean (firm fixed effect).
- Firm and year fixed effect gives the coefficients a changes interpretation.

Table 2: Tests of H1

Dependent variable = Investment

VARIABLES	Expected Sign	(1)	(2)	(3)	(4)
RE_VALUE_t	+	6.45***	4.43***		
$STATE\_INDEX_{93,t}$	?	-9.14***	-0.73		
$CASH\ FLOW_{t-1}$	+		2.14***		
Q_{t-1}	+		6.21***		
LN_ASSET_{t-1}	+		0.13		
LN_AGE_{t-1}	-		-6.99***		
$LEVERAGE_{t-1}$	-		-23.76***		
Observations		26,258	26,258		
R-squared		0.06	0.18		

$1 change in collateral is associated with 6 cents change in investment.

Testing H1 – FRQ in modified model (1a)

$$\tilde{INV}_{it} = \beta_1 RE\_\tilde{Value}_{it} + \beta_2 RE\_\tilde{Value}_{it} \times FRQ_{it-1} + \gamma_1 STATE\_\tilde{INDEX}_{st} + \gamma_2 FRQ_{it-1} + \sum_{j=1}^{J} \chi_j \tilde{X}_{jit-1} + \varepsilon_{it}$$

- *FRQ* is a proxy for financial reporting quality
  1. Accruals quality (*AQ*)
  2. Measure of information asymmetry (*IAC_Spread*)

- H_1: $\beta_2 < 0$

Table 2: Tests of H1

Dependent variable = Investment

VARIABLES	Expected Sign	(1)	(2)	(3)	(4)
RE_VALUE_t	+	6.45***	4.43***		
$STATE\_INDEX_{93,t}$	?	-9.14***	-0.73		
$CASH\ FLOW_{t-1}$	+		2.14***		
Q_{t-1}	+		6.21***		
LN_ASSET_{t-1}	+		0.13		
LN_AGE_{t-1}	-		-6.99***		
$LEVERAGE_{t-1}$	-		-23.76***		
AQ_{t-1}	?				
IAC_SPREAD_{t-1}	?				
AQ_{t-1}*RE_VALUE$_t$	**H_1: -**				
IAC_SPREAD_{t-1}* RE_VALUE$_t$	**H_1: -**				
Test of RE_VALUE + RQ*RE_VALUE					
Estimate		-	-		
t-stat		-	-		
Observations		26,258	26,258		
R-squared		0.06	0.18		

Table 2: Tests of H1

Dependent variable = Investment

Sensitivity is 15-20% lower for firms with higher FRQ.

VARIABLES	Expected Sign	(1)	(2)	(3)	(4)
RE_VALUE_t	+	6.45***	4.43***	4.62***	4.23***
$STATE\_INDEX_{93,t}$	?	-9.14***	-0.73	-2.98***	-1.81***
$CASH\ FLOW_{t-1}$	+		2.14***	2.32***	2.46***
Q_{t-1}	+		6.21***	5.88***	6.12***
LN_ASSET_{t-1}	+		0.13	1.26***	-0.14
LN_AGE_{t-1}	-		-6.99***	-5.35***	-7.93***
$LEVERAGE_{t-1}$	-		-23.76***	-22.98***	-26.19***
AQ_{t-1}	?			-0.43**	
IAC_SPREAD_{t-1}	?				0.49***
AQ_{t-1}*RE_VALUE_t	**H_1: -**			**-0.77****	
IAC_SPREAD_{t-1}* RE_VALUE_t	**H_1: -**				**-0.63****
Test of RE_VALUE + RQ*RE_VALUE					
Estimate		-	-	3.85	3.60
t-stat		-	-	8.40	7.53
Observations		26,258	26,258	18,029	20,483
R-squared		0.06	0.18	0.17	0.19

Testing H2 – Regression model

- We test H2 by replacing investment in (1a) with year-ahead disclosure quality in (2):

$$\widetilde{DQ}_{it+1} = \beta_1 RE\_\widetilde{Value}_{it} + \gamma_1 STATE\_\widetilde{INDEX}_{st} + \sum_{j=1}^{J} \chi_j \widetilde{X}_{jit} + \varepsilon_{it+1}$$

- *DQ* is one of our proxies for corporate disclosure:

1. *MDA_Length*: Length of the Management's Discussion and Analysis

   Retrieve 10-K filings of firms from SEC EDGAR and then employ text-mining programs to extract the MD&A section

2. One-year ahead *IAC_Spread*

H2: $\beta_1 < 0$

Table 4: Tests of H2

VARIABLES	Expected Sign	Dependent Variable: MDA_LENGTH_{t+1}	Dependent Variable: IAC_SPREAD_{t+1}
RE_VALUE_t	**H_2: -**	**-1.22****	**-0.83***
$STATE\_INDEX_{93,t}$	?	19.98***	5.33***
ROA_t	+	-15.25***	30.53***
Q_t	+	-1.06***	2.76***
LN_MVE_t	+	1.07***	2.41***
LN_AGE_t	+	9.94***	4.27***
$LEVERAGE_t$	-	8.72***	-10.65***
Observations		16,068	17,425
R-squared		0.23	0.12

Positive vs. Negative Shocks

Finally we test whether our results are symmetric for positive vs. negative collateral shocks.

The idea is that reporting quality can play a larger role when there is bad news.

We repeat our tests by splitting the sample into high vs. low shocks.

Table 3: Positive vs. Negative Shocks

VARIABLES	Negative Shock		Positive Shock	
RE_VALUE_t	4.64***	4.70***	6.93***	7.00***
$STATE\_INDEX_{93,t}$	-5.50***	-5.59***	-6.65***	-5.50***
$CASH\ FLOW_{t-1}$	2.72***	3.55***	2.10*	1.99**
Q_{t-1}	5.92***	5.49***	5.70***	2.53*
LN_ASSET_{t-1}	3.37***	2.52**	5.52***	6.15***
LN_AGE_{t-1}	-1.07	-3.91***	-4.17**	5.03***
$LEVERAGE_{t-1}$	-18.33***	-16.55***	-21.11***	-6.11***
AQ_{t-1}	-0.12		-0.07	-23.28***
IAC_SPREAD_{t-1}		0.53*		0.24
AQ_{t-1}*RE_VALUE_t	**-1.17****		**-0.75**	
IAC_SPREAD_{t-1}* RE_VALUE_t		**-1.36*****		**0.14**
Test of RE_VALUE + FRQ*RE_VALUE				
Estimate	3.47	3.34	6.18	7.14
t-stat	3.63	3.43	6.84	7.33
Observations	2,541	2,825	2,841	2,869
R-squared	0.18	0.19	0.22	0.22

Table 5: Positive vs. Negative Shocks

	Negative Shock		Positive Shock	
VARIABLES	MDA_LENGTH_{t+1}	IAC_SPREAD_{t+1}	MDA_LENGTH_{t+1}	IAC_SPREAD_{t+1}
RE_VALUE_t	**-3.14****	**-3.07*****	**-0.55**	**-0.03**
$STATE\_INDEX_{93,t}$	24.17***	10.67***	15.59***	5.01**
ROA_t	-22.48**	33.77***	-16.65**	32.02***
Q_t	-1.26	3.05***	-0.28	3.70***
MVE_t	-0.47	1.49*	1.22	0.18
AGE_t	17.59***	1.98	7.84**	2.30
$LEVERAGE_t$	26.56***	-16.49***	12.43**	-11.41***
Observations	1,674	2,364	2,813	2,520
R-squared	0.339	0.116	0.175	0.160

Summary of results

1. Consistent with Chaney et al. (2009), for each $1 increase (decrease) in real estate assets, firms increase (decrease) investment by $0.06.

2. Firms with higher reporting quality have lower exposure to shocks to collateral.
   - One STD increase in reporting quality reduces the sensitivity of investment to collateral by 17%.

3. Firms change disclosure in response to the shock.
   - MDA are longer and information asymmetry decreases after collateral decreases.

4. Effect appears to be stronger for decrease (as opposed to increase) in collateral values.

Summary of results and conclusions

Overall we show two main results:

1. Firms with higher reporting quality have lower exposure to shocks to collateral.

2. Firms change its disclosure in response to the shock.

Results contribute to the literature by:

(i) Using a shock to financing capacity to investigate the relation between reporting quality and investment.

(ii) Investigate the endogenous disclosure reaction to financing capacity (and ultimately investment policy).

Thank you