

# Lecture 9: Empirical Literature in Corporate Finance

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# Roadmap

- 1 Introduction
- 2 Empirical Evidence on Financial Frictions
- 3 Tobin's Q Theory
- 4 Investment-Cash Flow Sensitivity Literature
- 5 Conclusion

# Motivation

- In this empirical part of the course, we've explored the following issues so far.
- What basic techniques are available for linking our capital structure theories to data?
- What are the problems with these techniques?
- What can we do to overcome these problems?

# Motivation

- Now we turn to look at the literature on the issue.
- What frictions matter the most for capital structure decisions?
- How do financial frictions affect real investment behaviour?
- I'll draw on the article "Empirical Capital Structure: a Review" by Parsons and Titman (2008) quite heavily in this lecture.
- You can find the paper citations in their reference list.
- You **need not** go read the article above or the ones I cite hereafter. Just remember the story for each friction and topic.
- Here, I'll mention some of the results that have come from the literature.

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# (1) Taxes

- Straightforward implications and arguably the easiest to quantify.
- I.e. we know what the statutory tax rates are: should be easy to measure the tax advantage of debt.
- Idea: a firm with a higher tax exposure is likely to borrow more through this friction.
- **Non-debt tax shields** (NDTS) are things like depreciation deductions, tax credits and net operating losses.
- If these NDTS are high for a firm, considerably reduces the tax advantage of debt.

# (1) Taxes

- Empirical implication: firms with higher NDTs should have lower leverage ratios.
- Most of these studies look at cross-sectional variation in financial policy.
- Early studies: 1980 – 1990 found no such evidence. Often firms with higher NDTs have higher **leverage ratios** than those that don't.

# (1) Taxes

- MacKie-Mason (1990): but a lot of NDTs come from investment tax credits. These usually apply to firms that are highly profitable. High NDTs doesn't necessarily mean a low marginal tax rate!
  - Looks at the **decision to issue debt** rather than leverage ratios.
  - Debt issuances are not correlated with investment tax credits.
  - Since investment tax credits do not affect the marginal tax rates of profitable firms.
  - "Tax shields do affect financing when they are likely to change the marginal tax rate on interest deductions".



# (1) Taxes

- Natural experiment: Tax Reform Act of 1986 (USA).
- Reduced tax burden for most U.S. corporations.
- Givoly, Hahn, Ofer and Sarig (1992) found that debt became less popular after the Act; highly-taxed firms decreased borrowing the most.
- In summary, the empirical support started-off a bit shaky. The theory was clear and found support eventually.

## (2) Bankruptcy Costs

- The focus here is typically on the tangibility of a firm's assets. Why?
- A firm with more tangible assets can liquidate them in dire financial times and hand-over the proceeds to creditors.
- Seems that a firm with more tangible assets would face lower costs of bankruptcy.

## (2) Bankruptcy Costs

- Recall the trade-off theory: tax benefits versus bankruptcy costs determines optimal leverage.
- A firm with lower bankruptcy costs will borrow more holding all else constant.
- Has been **widely** documented in the data that firms with more tangible assets borrow more.
- If a bank lends a firm with little tangible assets money, they'll demand a higher interest rate knowing that they reap less in the event of default. Ex-ante pricing.

### (3) Agency Conflicts

- These asset tangibility results can also be interpreted in light of agency conflicts.
- We can't **observe** the magnitude of agency frictions in the data.
- A firm with a lot of physical assets is likely to suffer less from these types of issues though.
- E.g. compare Springfield Nuclear Power Plant with Apple.
- Much more scope for managers of Apple to waste resources on things like pet projects that aren't that valuable to the firm.
- Again this increasing leverage in asset tangibility result seems to suggest that agency conflicts are important quantitatively.

## (4) Imperfect and incomplete capital markets

- There has been some work, which looks at **internal capital markets** of firms.
- E.g. consider a multinational firm with a parent in the U.S. and subsidiaries in the U.K. and Ghana.
- Ghanaian financial markets are less developed than U.K. markets
- Empirically it's been found that the Ghanaian subsidiary **will be more reliant upon funding from the U.S. parent** than the U.K. subsidiary all else constant (e.g. see Desai, Foley and Hines (2004)).
- Seems that the development of capital markets matters a lot also. Not really a concern for firms in developed countries though.

## (5) Information asymmetry

- This one's very hard to get at.
- Studied in the context of pecking order theory.

## (5) Information asymmetry

- Pecking-order theory says that firms will always first issue securities/draw on funds that are less sensitive to the information asymmetry friction.
- The order would be: internal funds (cash/retained earnings), bank debt, bond debt then equity.
- Empirical tests on this issue usually are a horse-race between the tradeoff and pecking order theories.
- Evidence has been mixed.

## (5) Information asymmetry

- Syham-Sunder and Myers (1998): according to pecking order, the **financing deficit** (so uses of funds less sources) should be positively correlated with debt issuance for a period.
- Trade-off theory can be modelled as a change in debt depending on how far current debt levels are from a target.
- Find strong support for pecking-order.
- They only had data on 157 firms though!
- Frank and Goyal (2002) use a larger sample and find the opposite result!



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## Q theory

- What determines a firm's **real investment** strategy?
- We touched on this earlier when we thought about Modigliani & Miller (1958).
- How can we take this to the data?

## Q theory

- If there are no financial frictions in the world, then all we need to know is how **shareholder value** changes as investment changes.
- This is related to our investment FOCs: marginal benefit equals marginal cost.
- This is the definition of Tobin's marginal  $q$ , the marginal change in shareholder value over the marginal change in capital.
- Tobin's marginal  $q$  is a sufficient statistic for investment in a frictionless world: it just tells you the marginal cost over the marginal benefit of investment.
- Should equal **one** at the optimum. Why?

## Q theory

- We don't see marginal  $q$  in the data though.
- Proxy for it with average  $q$ .
- Average  $q$  defined as firm value divided by book value.

## Q theory

- So in general

$$\frac{i_t}{k_t} = \beta_0 + \beta_1 q_t + \epsilon_t$$

- This is a regression equation when we have a time series over  $t$ !
- If there truly are **no** financial frictions, then this regression equation should describe firm investment behaviour.

## Q theory

- What happens if we run an investment regression with average  $q$  standing-in for marginal  $q$ ?
- All hell can break lose...and it can cause decades worth of bloodshed...

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## Fazzari, Hubbard and Petersen (1988)

- If there are no financing constraints, then  $q$  should be sufficient for investment.
- I.e. you tell me  $q$ , I tell you investment.
- Fazzari, Hubbard and Petersen (1988) got a dataset of manufacturing firms and basically ran an investment regression against average  $q$ .
- They also stuck **cash flow** on the right-side of the regression...



## Fazzari, Hubbard and Petersen (1988)

- Found that  $q$  didn't matter all that much but cash flow did, when it comes to explaining investment behaviour!
- The interpret this as saying that there are financial constraints in the data.
- If I increase a firm's cash flow a little bit for a given period, I'll significantly increase their investment level.
- Would happen typically if we felt as though the firm was constrained.
- Notice though that they had to make a judgement call on what they though constituted a "constrained firm".
- Classed firms with low dividend payments as constrained and those with high payments as unconstrained.

## Fazzari, Hubbard and Petersen (1988)

- Sparked a line of research: is the investment behaviour of constrained firms more sensitive to cash flow changes than non-constrained firms?
- They say yes...

## The empirical wars

- Kaplan and Zingales (1997) did the same thing and got the opposite result...
- Used the same data but looked deeper at the firms' annual reports to group them into statuses: "financially constrained", "possibly financially constrained" and "not financially constrained".
- Say that managers choose to finance investment mainly based on internal cash flow due to risk aversion.
- Then a million other papers came with conclusions on both sides.
- Total chaos and disagreement.....what do we do?

# The empirical wars

- (Quantitative) theory to the rescue!
- Lets develop a model that's theoretically sound and map it to data.
- Then we can see what the model and data imply about financing constraints and this sensitivity.
- Known as the structural approach to corporate finance.
- We won't talk about this in anymore detail though due to time constraints.

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# Summary

- Lots of empirical work studying individual financial frictions.
- A nice, straightforward and implementable approach to research.
- It has problems though.