Solvay Brussels School
Economics & Management

Corporate Valuation and Financing

Empirical Capital Structure

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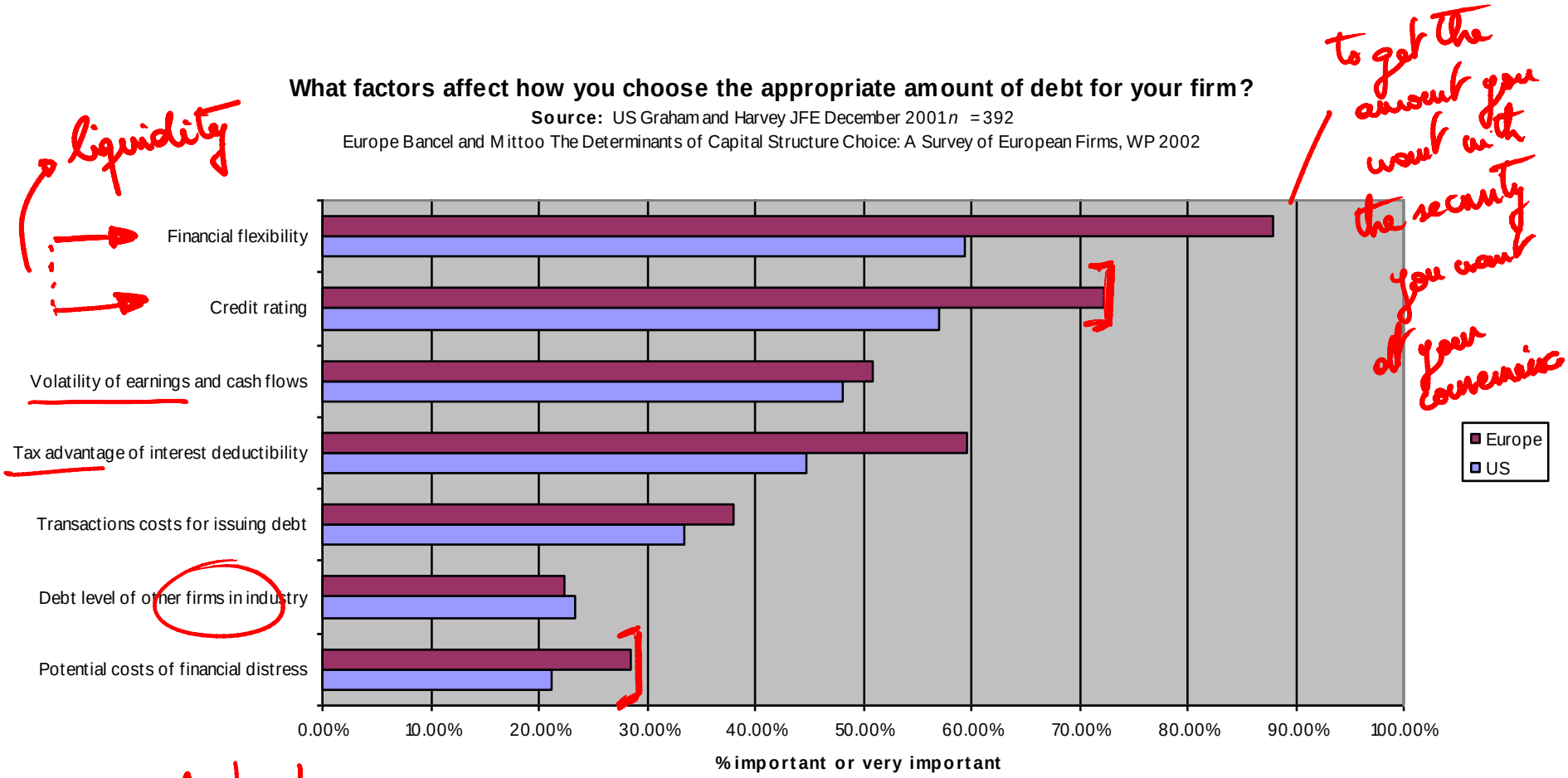
Questions

- What level of debt?
- What financing next time?
- Determinants in practice?
- Weight of determinants?
- Impact on securities' pricing?
- Short term vs long term performance?

Empirical results on Level of debt



Survey evidence and capital structure theories

- **Trade-off theory**
  - ❖ Corporate interest deduction moderately important
  - ❖ Cash flow volatility important
  - ❖ 44% have strict or somewhat strict target/range

But:

  - ➢ Expected distressed costs not important
  - ➢ Personal taxes not important

- **Pecking order theory**
  - ❖ Firm value flexibility
  - ❖ Issue debt when internal funds are insufficient
  - ❖ Equity issuance affected by equity undervaluation

But:

  - ➢ Equity issuance decision unaffected by ability to obtain funds from debt,…
  - ➢ Debt issuance unaffected by equity valuation

Changes of K structure: Event studies on Exchange offers

- In general, it is difficult to measure the impact of capital structure changes. **Why?**
- In an exchange offer or swap, one class of securities is exchanged for another in a deal that involves no cash.
  Why is this an interesting phenomenon to study?

the size of the firm doesn't change but the allocation of D & E

- **Masulis [1980]** and many others find statistically significant announcement effects. On average, in leverage increasing offers, the announcement effect is of +7.6% while on leverage decreasing offers, it is of -5.4%
- Which theoretical standpoints would lead to that result?
- How would you test for them?

Event studies on New Equity Issuances

- Equity issues are rare
- Almost all of the studies find a decrease in price around annoucement

	Average impact on 2 days	Average dilution
» Asquith-Mullins [1986]	-2.7%	-31%
» Masulis-Korwar [1986]	-3.25%	-22%
» Mikkelson-Partch [1986]	-4.46%	-29.5%
Unweighted average	-3.5%	-27.5%

3%

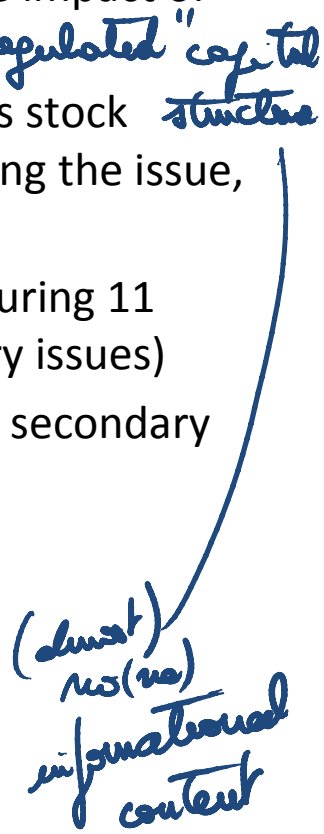
30%

- Would you expect a negative effect?

- Why?

New Equity Issuances (2)

- Asquith & Mullins [1986]
  - » Effect is stronger on block trades (78% dilution for industrials)
  - » Dilution lower for highly regulated companies such as utilities (price impact of -0.9% dilution of 12%)
  - » Timing: during the 2 years prior to an offering issue, industrial firm's stock outperform the market by an average of 33%. In the 2 years following the issue, sample industrial firms underperform the market by 6%.
  - » Announcement day reduction related to stock price performance during 11 months prior to month of issue for primary issues (not for secondary issues)
  - » Announcement day reduction related to size of issue (especially for secondary issues; no such relationship for utilities)



The wave of debt –equity swaps in the US (80's)

- Example
  - On February 9, 1982, Hammermill Paper registered with the SEC to swap as many as 400'000 common shares for $13.4 mios of the company's 8.07% promissory notes due February 1, 1997. The resulting swap increased Hammermill's 1st quarter earnings by $3.7 mios, accounting for more than a third of its earnings for that period. Between February 9 and 10, the market value of Hammermil's equity fell by 4.5%
    - ✓ Why would a corporation do a debt-equity swap? → because interest rates ↑
    - ✓ What would you expect managers (and/or bankers) to propose as gains? → buy-back financial profits
    - ✓ What would you expect as possible real gains?
    - ✓ In which interest rate context would they be valid?
- An alternative: insubstance defeasance. Example:
  - On January 28, 1985, United Airlines announced that its preceding 4th quarter earnings included a $3 mios extraordinary gain from the defeasance of $38 mios of outstanding notes and that earnings for all of 1984 included a defeasance gain of $21.5 mios, representing 7.6% of UAL's 1984 net income. Between January 28 and 29, the market value of UAL's equity declined by 4.6%.

Smith (1993): Raising Capital, theory and evidence

- 2 objectives:
  - theory and evidence of market response to security offer announcements
  - evaluate different methods of marketing corporate securities
- Market Reactions to Security Offer Announcements: negative (see Table)
  - Possible explanations:
    - ✓ EPS dilution
    - ✓ Price pressure (downward sloping curve)
    - ✓ Optimal capital structure
    - ✓ Insider Information
    - ✓ Unanticipate Announcements
    - ✓ Ownership Changes
- Alternative Methods of Marketing Security Offerings
  - Rights versus firm-commitment underwritten offerings
  - Negotiated versus Competitive Bid Contracts
  - Shelf versus Traditional Registration
  - IPOs
    - ✓ Underpricing
    - ✓ Best Efforts versus Firm Commitment Contracts
    - ✓ Stabilization Activity and the Green Shoe Option

Security Offer Announcements

- EPS Dilution
  - » against Efficient Market Hypothesis
  - » no credible supporting evidence
- Price Pressure
  - » only risk and expected returns markets
  - » many substitutes
  - » Scholes: large block offerings
    - ✓ decline unrelated to the size
  - » little empirical evidence
- Optimal Capital Structure
  - » do new security offering move away companies from optimum? Not credible
- Information Disparity Between Management and Potential Investors
  - » Implied Changes in Net Operating Cash Flow
    - ✓ New Investment Expenditure
    - ✓ Reduction in some liability
    - ✓ Increase in future dividends
    - ✓ Reduction in expected op. Cash flow
  - » Information Disparity
    - ✓ Stock issue when overvalued?
  - » Leverage change
    - ✓ Look at pure financial structure changes
- Unanticipated Announcements
  - » Stock price change larger if announcement unanticipated
    - ✓ Debt issue more predictable
    - ✓ Utilities use external capital markets more frequently
- Changes in Ownership and Control
  - » Security sales = signal
  - » Example: carve out
    - ✓ Sale of minority offering of a wholly-owned subsidiary

Response to Announcement of Security Offerings

	Type of Issuer	
	Industrial	**Utility**
Type of Security Offering		
Common Stock	-3.14% [a] (155)	-0.75% [b] (403)
Preferred Stock	-0.19% [c,*] (28)	+0.08% [d,*] (249)
Convertible Preferred Stock	-1.44% [d] (53)	-1.38% [d] (8)
Straight Bonds	-0.26% [e,*] (248)	-0.13% [f,*] (140)
Convertible Bonds	-2.07% [e] (73)	n.a. [g]

[a] Source: Asquith/Mullins (1986), Kolodny/Suhler (1985), Masulis/Korwar (1986), Mikkelson/Partch (1986), Schipper/Smith (1986)

[b] Source: Asquith/Mullins (1986), Masulis/Korwar (1986), Pettway/Radcliffe (1985)

[c] Source: Linn/Pinegar (1986), Mikkelson/Partch (1986)

[d] Source: Linn/Pinegar (1986)

[e] Source: Dann/Mikkelson (1984), Eckbo(1986), Mikkelson/Partch (1986)

[f] Source: Eckbo(1986)

[g] Not available (virtually none are issued by utilities)

*interpreted by the authors as not statistically significantly different from 0.

Source: Smith, C. Raising Capital: Theory and Evidence [1990]

Response to Announcement of Pure Financial Structure Δ

	Security Issued	Security Retired	Two-Day Announcement Period Retun
Leverage Increased			
Stock Repurchase (Masulis 1980)	Debt	Common	21.9%
Exchange offer (Masulis 1983)	Debt	Common	14.0%
Exchange offer (Masulis 1983)	Preferred	Common	8.3%
Exchange offer (Masulis 1983)	Debt	Preferred	2.2%
Exchange offer (McConnell/Schlarbaum 1981)	Income Bonds	Preferred	2.2%
No change in leverage			
Exchange offer (Dietrich 1984)	Debt	Debt	0.6% (not sign.)
Security Sale (Mikkelson 1981)	Debt	Debt	0.2% (not sign.)
Leverage reduced			
Exchange offer (Masulis 1983)	Common	Debt	-9.9%
Security Sale (Eckbo 1986 & Mikkelson/Partch 1986)	Common	Debt	-4.2%
Conversion-forcing call (Mikkelson 1981)	Common	Convertible	-0.4% (not sign.)
Conversion-forcing call (Mikkelson 1981)	Common	Preferred	-2.1%

Source: Smith, C. Raising Capital: Theory and Evidence [1990]

More recent studies

- Barclay, Smith & Watts [1995]
  - » Data base: COMPUSTAT 1963-1993 6,780 non financial US companies
  - » Leverage measure: Debt / (Debt + Market value of equity)

	Mean	Standard Deviation	Percentiles 25th	Median	75th
Leverage	25%	17.89%	10.30%	22.82%	37.47%

More recent studies

- Rajan & Zingales [1995]
  - » International data – 1987-1991
  - » Large listed companies
  - » Difference in accounting rules: pensions, leases

  - » Do leverage ratios vary across countries?
  - » Are determinants of leverage identical across countries?

Rajan & Zingales [1995]

Table II - Balance Sheets for Non-Financial Firms 1991

	US	Jap	Germ	F	I	UK	Can	Average
Cash	11.2	18.4	8.8	10.3	10.5	11.4	8.2	11.3
Ac.Rec.	17.8	22.5	26.9	28.9	29.0	22.1	13.0	22.9
Inv.	16.1	13.9	23.6	17.4	15.6	17.7	11.0	16.5
Cur.As.Other	2.9	3.0	0.1	1.7	1.6	3.7	1.9	2.1
Fixed As	52.0	42.2	40.6	41.7	43.3	45.1	65.9	47.3
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Debt in cur.liab.	7.4	16.4	9.9	11.6	16.2	9.6	7.3	11.2
Acc.pay.	15.0	15.4	11.5	17.0	14.7	13.7	13.3	14.4
Cur.Liab. Other	11.0	10.4	8.7	14.8	12.2	16.7	2.8	10.9
	33.4	42.2	30.1	43.4	43.1	40.0	23.4	36.5
Def. Taxes	3.2	0.1	0.8	1.3	1.5	0.9	4.4	1.7
LT Debt	23.3	18.9	9.8	15.7	12.1	12.4	28.1	17.2
Minority Int	0.6	0.9	1.6	3.9	3.4	1.1	2.0	1.9
Reserve Untaxed	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.2
Liab.other	5.8	4.8	28.7	6.3	7.8	3.4	2.6	8.5
Liab. total	66.3	66.9	72.7	70.6	67.9	57.8	60.5	66.1
Equity	34.1	33.2	28.0	31.2	32.6	42.2	39.7	34.4
	100.4	100.1	100.7	101.8	100.5	100.0	100.2	100.5

Rajan & Zingales [1995]

Table III Leverage in different countries

Median debt to total capital in 1991

	Book	Book adjusted	Market	Market adjusted	EBITDA /Interest
United States	37%	33%	28%	23%	4.05x
Japan	53%	37%	29%	17%	4.66x
Germany	38%	18%	23%	15%	6.81x
France	48%	34%	41%	28%	4.35x
Italy	47%	39%	46%	36%	3.24x
United Kingdom	28%	16%	19%	11%	6.44x
Canada	39%	37%	35%	32%	3.05x

Adjusted debt = Net Debt = Debt – Cash
Book: using book equity, Market: using market value of equity

Rajan & Zingales [1995] : Determinants of leverage

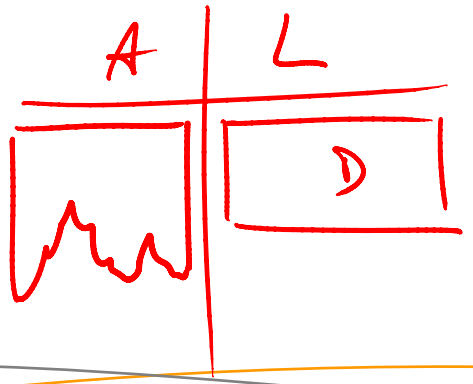
- Tangibility of assets: Fixed Assets/Total Assets ↑Debt
  - ✓ Collateral => lower agency cost of debt
  - ✓ More value in liquidation
- Market to book ↓Debt
  - ✓ Growth opportunities - underinvestment
  - ✓ Costs of financial distress
- Size ↑Debt
  - ✓ Lower probability of bankruptcy
  - ✓ Less asymmetry of information
- Profitability
  - ✓ Myers Majluf: profitable companies prefer internal funds

Rajan & Zingales [1995]

Table IX Factors Correlated with Debt to Market Capital

	US	Jap	Germ	F	I	UK	Can
Tangibility	0.33***	0.58***	0.28*	0.18	0.48**	0.27***	0.11
	(0.03)	(0.09)	(0.17)	(0.19)	(0.22)	(0.06)	(0.07)
Market-to-book	-0.08***	-0.07***	-0.21***	-0.15**	-0.18*	-.06**	-0.13***
	(0.01)	(0.02)	(0.06)	(0.06)	(0.11)	(0.03)	(0.03)
Logsale	0.03***	0.07***	-.06***	-0.00	0.04	0.01	0.05***
	(0.00)	(0.01)	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)
Profitability	-0.6***	-2.25***	0.17	-0.22	-0.95	-0.47**	-0.48***
	(0.07)	(0.32)	(0.47)	(0.53)	(0.77)	(0.24)	(0.17)
Nb observations	2207	313	176	126	98	544	275
Pseudo R^2	0.19		0.14	0.28	0.12	0.19	0.30

Standard errors are in parentheses.
*,** and ***, significant at the 10, 5, 1 percent respectively.



International differences

- Leverage is higher for Japanese than for US firms.
  German firms somewhat in between (see OECD data).
  - » Where can this difference come from?
    (Draw on your knowledge of these countries)

- Bank loans dominate in Germany and Japan while public debt (bonds) dominate in the US.
- Debt tends to be short term in Japan and long term in the US.

Changes in K : more recent studies

- Kemley, Deen and Doron Nissim [2002]
  - » Valuation of the Debt Tax Shield, *Journal of Finance*, 57, 5 (October 2002) 2045-2073
  - » Theory:
    - ✓ $V_L = V_U + t_C D$ & $V_U = E(FOI)/k_A$
      ➔ $E(FOI) = k_A (V_L - t_C D)$
    - ✓ Regression: $E(FOI) = \alpha_1 + \alpha_2 k_A (V_L - \beta D) + \varepsilon$
  - » Sample: Compustat 1963-1993 2,964 firms
  - » Main finding:
    - ✓ Debt tax shield approximately equal to
      - 40% of debt balance
      - 10% of firm value (see also Graham 2000)
    - ✓ Footnote 19: The mean ratio of the book value of debt to the total market value (i.e. including operating liabilities) is 0.24. Hence, the mean estimated value of the net debt tax shield relative to the firm value is 0.24 x 0.4 = 0.096

An example of analysis

- In theory covenants can limit the agency costs of debt. In practice, depending on the ability of creditors to monitor the firm's actions, covenants can be costly to implement. This monitoring ability itself depends on the observability of investment decisions of the firm.
  - The difference between tangible and intangible items from that standpoint. Where does it come from?
- Consider two companies (1980-1983):
  - Eastman Kodak:
    - ✓ Photographic products 80%, chemicals 20%
    - ✓ Sales $10.2 bns (1983), 57% domestic
    - ✓ 50% payout ratio
    - ✓ End of 1982 market value of equity = 170% book value
    - ✓ Operating cash flows: 16.4% of total capital
  - Inland Steel:
    - ✓ Steel production and sales, sales $2.8 bns (1982), market share 7.1%
    - ✓ Total profits 1980-1983: $46.2 mns
    - ✓ Total dividends paid 1980-1983: $118.8 mns
    - ✓ End of 1982 market value of equity = 49% book value
    - ✓ Operating cash flows: 3.9% of total capital
    - ✓ Equity issue January 1983: $56.9 mns

An example of analysis (2)

- What would the static classical theory predict?

- What would you predict?

But: problems with empirical studies

- Require data basis + computing capacities
- Accounting convention obscure relevant variables
- Problem for isolating capital structure decisions from other decisions
- Which econometric techniques to use?
- What are the testable hypothesis?
- How to measure the relevant variables?
- Contradictory results
  - » Harris & Ravis (1990) “The second major trend in financial structure has been the secular increase in leverage.” (p.331)
  - » Barclay, Smith, Watts (1995) “When viewed over the entire 30-year period, however, both market leverage ratios and dividend yields appear to be remarkably stable.” (p. 5)

References

- Masulis (1980a, 1980b,1983)
- Bradley, Jarrey & Kim (1984)
- Asquith & Mullins (1986)
- Smith (1993)
- Rajan & Zingales (1995)
- Damodaran (1999)
- Graham & Harvey (2001)
- Barclay & Smith (2005)