Topics in Financial Economics: Lecture 2

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- Summarize the theories on the capital structure
- The effects of taxes

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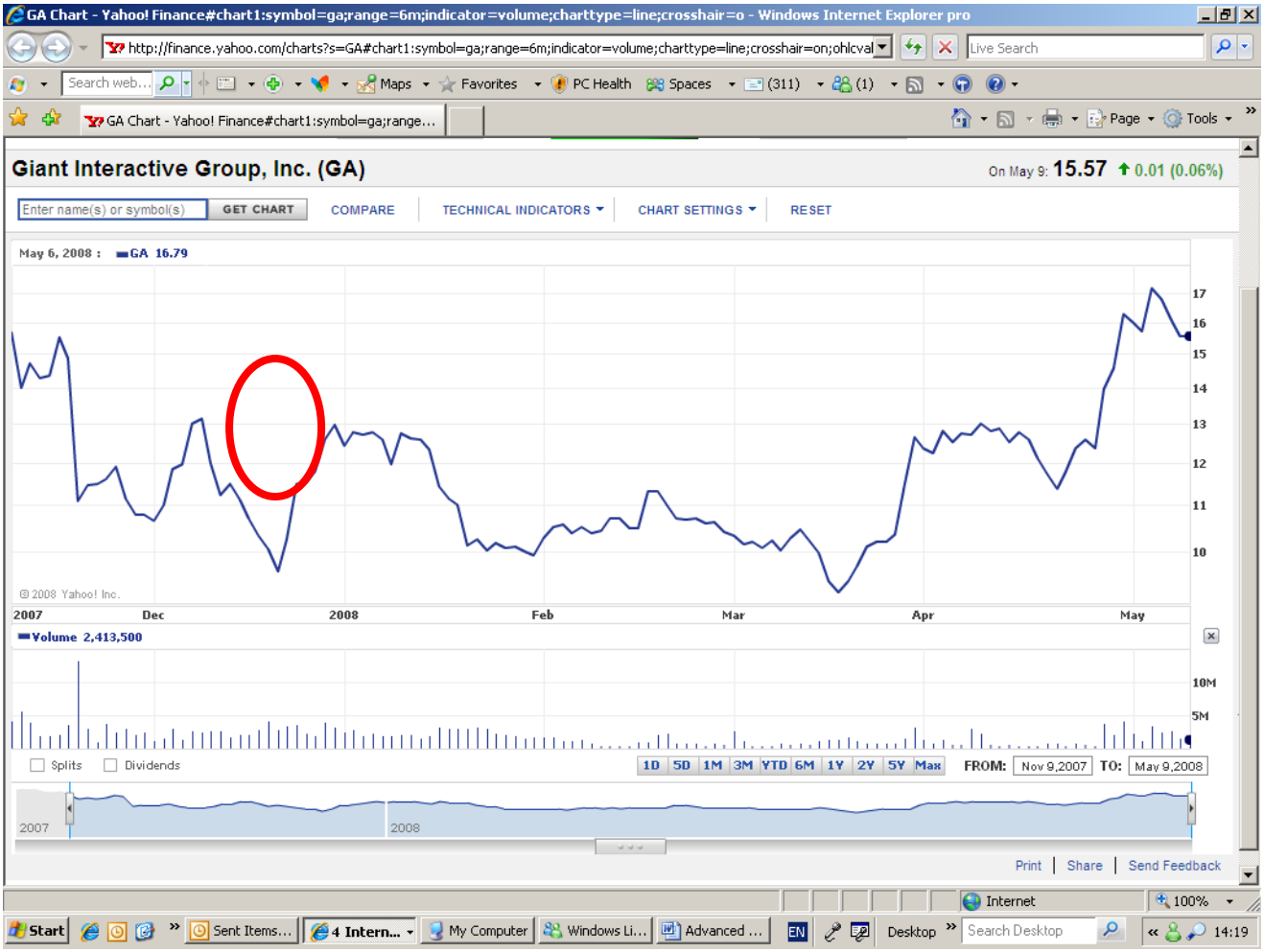
- figures on the event studies.

EXHIBIT 19.4 Stock Market Response to Pure Capital Structure Changes

Type of Transaction	*Security Issued*	*Security Retired*	*Average Sample Size*	*Two-Day Announcement Period Return (%)*
Leverage-Increasing Transactions:				
Stock repurchase[a]	Debt	Common	45	21.9%
Exchange offer[b]	Debt	Common	52	14.0
Exchange offer[b]	Preferred	Common	9	8.3
Exchange offer[b]	Debt	Preferred	24	2.2
Exchange offer[c]	Income bonds	Preferred	24	2.2
Transactions with No Change in Leverage:				
Exchange offer[d]	Debt	Debt	36	0.6°
Security sale[e]	Debt	Debt	83	0.2°
Leverage-Reducing Transactions:				
Conversion-forcing call[e]	Common	Convertible debt	57	−0.4°
Conversion-forcing call[e]	Common	Preferred	113	−2.1
Security sale[f]	Convertible debt	Convertible bond	15	−2.4
Exchange offer[b]	Common	Debt	30	−2.6
Exchange offer[b]	Preferred	Preferred	9	−7.7
Security sale[f]	Common	Debt	12	−4.2
Exchange offer[b]	Common	Debt	20	−9.9

Example 2

Giant Interactive (a Chinese game company) jumped more than 17% after announcing share repurchase on Dec 24th, 2007



Details:

http://seekingalpha.com/article/58278-giant-interactive-soars-on-200m-repurchase

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- It is generally agreed that leverage
  - **increases** with fixed assets, nondebt tax shields, growth opportunities, and firm size;
  - **decreases** with volatility, advertising expenditures, research and development expenditures, bankruptcy probability, profitability and uniqueness of the product.

International Data

Rajan & Zingales (1995)

- The aggregate leverage rate for non-financial corporations: Germany $\approx$ UK $<$ US $\approx$ Japan $\approx$ France $\approx$ Italy $\approx$ Canada (Table III Panel B)

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- The aggregate leverage rate for non-financial corporations: Germany $\approx$ UK $<$ US $\approx$ Japan $\approx$ France $\approx$ Italy $\approx$ Canada (Table III Panel B)
- Leverage increases with tangible assets and the firm size, and decreases with growth opportunity and profitability (Table IX).

Table III—*Continued*

Panel B: Extent of Adjusted Leverage in Different Countries

Country	Nonequity Liabilities to Total Assets (Medians (Aggregate))		Debt to Total Assets (Medians (Aggregate))		Debt to Net Assets (Medians (Aggregate))		Debt to Capital (Medians (Aggregate))	
	Book	Market	Book	Market	Book	Market	Book	Market
United States	0.52 (0.61)	0.42 (0.45)	0.25 (0.33)	0.16 (0.24)	0.32 (0.41)	0.20 (0.28)	0.33 (0.45)	0.23 (0.31)
Japan	0.62 (0.69)	0.37 (0.48)	0.21 (0.30)	0.12 (0.21)	0.33 (0.44)	0.16 (0.27)	0.37 (0.49)	0.17 (0.28)
Germany	0.50 (0.58)	0.41 (0.46)	0.11 (0.05)	0.10 (0.04)	0.17 (0.07)	0.13 (0.05)	0.18 (0.10)	0.15 (0.06)
France	0.69 (0.75)	0.59 (0.65)	0.18 (0.22)	0.13 (0.18)	0.32 (0.34)	0.25 (0.27)	0.34 (0.46)	0.28 (0.36)
Italy	0.68 (0.69)	0.68 (0.69)	0.21 (0.21)	0.21 (0.21)	0.33 (0.33)	0.31 (0.33)	0.39 (0.41)	0.36 (0.41)
United Kingdom	0.47 (0.48)	0.35 (0.35)	0.10 (0.13)	0.08 (0.09)	0.16 (0.18)	0.10 (0.11)	0.16 (0.19)	0.11 (0.13)
Canada	0.48 (0.56)	0.49 (0.50)	0.32 (0.36)	0.26 (0.32)	0.36 (0.41)	0.30 (0.36)	0.37 (0.44)	0.32 (0.40)

Table IX

Factors Correlated with Debt to Book and Market Capital

The dependent variable is book leverage which is adjusted debt to adjusted debt plus book value of adjusted equity in 1991. Tangibility is the ratio of fixed assets to the book value of total assets. Market-to-book is the ratio of the book value of assets less the book value of equity plus the market value of equity all divided by the book value of assets. Logsale is the logarithm of net sales. Profitability is EBITDA divided by book value of assets. All the explanatory variables are four year averages (1987–90). Standard errors are in parentheses. The regression includes an intercept whose coefficient is not reported. The regression is estimated using maximum likelihood and a censored Tobit model. The estimated model is: $\text{Leverage}_{[\text{Firm i}]} = \alpha + \beta_1 \text{ Tangibility}_i + \beta_2 \text{ Market-to-book Ratio}_i + \beta_3 \text{ Log Sales}_i + \beta_4 \text{ Profitability}_i + \epsilon_i$.

Country Variable	United States	Japan	Germany	France	Italy	United Kingdom	Canada
			Panel A: Book Capital				
Tangibility	0.50***	1.41***	0.42**	0.53**	0.36	0.41***	0.26***
	(0.04)	(0.18)	(0.19)	(0.26)	(0.23)	(0.07)	(0.10)
Market-to-book	−0.17***	−0.04	−0.20***	−0.17**	−0.19	−0.13***	−0.11***
	(0.01)	(0.04)	(0.07)	(0.08)	(0.14)	(0.03)	(0.04)
Logsale	0.06***	0.11***	−0.07***	0.02	0.02	0.026***	0.08***
	(0.01)	(0.02)	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)
Profitability	−0.41***	−4.26***	0.15	−0.02	−0.16	−0.34	−0.46**
	(0.1)	(0.60)	(0.52)	(0.72)	(0.85)	(0.30)	(0.22)
Number of observations	2079	316	175	117	96	522	264
Pseudo R^2	0.21	0.29	0.12	0.12	0.05	0.18	0.19
			Panel B: Market Capital				
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*	−0.06**	−0.13***
	(0.01)	(0.02)	(.06)	(0.06)	(0.11)	(0.03)	(0.03)
Logsale	0.03***	0.07***	−0.06***	−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)
Number of observations	2207	313	176	126	98	544	275
Pseudo R^2	0.19		0.14	0.28	0.12	0.19	0.30

*, **, and ***, significant at the 10, 5, and 1 percent level, respectively.

two-digit Standard Industrial Classification industry. In the 'within' estimation, observations are differences from the industry means. From the magnitude of the coefficients (estimates not reported), in the United States tangibility, the market to book ratio, and size seem to be proxy for both the industry the firm is in, and idiosyncratic characteristics of the firm itself. Interestingly, the negative relationship between profitability and leverage appears to be specific to the within-industry regression. For the between industry regression, the coefficient is positive.

Three Categories of Theories: an Outline

- Break through the conditions of MM:

1. A firm's financing decisions do not change the cash flows generated by its investments.
2. There is no information asymmetry between investors and the firm (the management).
3. There are no corporate tax, nor taxes or transaction costs associated with security trading.
4. Individuals can borrow/lend at the same rates as corroborates.

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  3. Break through condition 1 $\Rightarrow$ incomplete contract approaches: underlines how to allocate control rights.

The Tax Benefit of Debt

Corporations pay taxes on their profits after interest payments are deducted. Thus, interest expense reduces the amount of corporate taxes. This creates an incentive to use debt.

An example: Safeway had earnings before interest and taxes (EBIT) of $1.25 billion and interest expenses of about $400 million. Safeway's marginal corporate tax rate was 35%.

TABLE 15.1 **Safeway's Income with and without Leverage, 2005 ($ million)**

	With Leverage	Without Leverage
EBIT	$1,250	$1,250
Interest expense	−400	0
Income before tax	850	1,250
Taxes (35%)	−298	−438
Net income	$552	$812

Q(5ct): How much in total is paid out to investors with leverage? How much without?

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- $V_D t_c$: Tax shield of debt, proportional to the corporate tax rate. Value gained from the fact that debt interests are tax deductible.
- More generally, if the tax on dividend is t_D, the personal tax is t_P, then the tax shield equals $V_D(1 - \frac{(1-t_c)(1-t_D)}{1-t_P})$ (one problem in the exercise).

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- There must be an optimal level of leverage. Take a picture.

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- Should a firm borrow until it feels financially stressed?
- It does not seem so. What is the debt ratio of Microsoft, IBM, Google...(exercise)?
- Wald (1999) (cited by Myers (2001) reports that high profits mean low debt. Clearly counter the trade-off theory.

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- International data: table VI of Rajan&Zingales (95) where tax shield calculated with the top personal tax rates. However, the effects disappear by using the tax rates for "average" citizen.
- Account for (partly) why Germany and England have low leverage rate: In both countries, the creditors rights are more strictly enforced in case of financial distresses.

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- International data: table VI of Rajan&Zingales (95) where tax shield calculated with the top personal tax rates. However, the effects disappear by using the tax rates for "average" citizen.
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    - Germany: Secured creditors can recover their claims even after bankruptcy filing.

Critical Thinking: In

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- Account for (partly) why Germany and England have low leverage rate: In both countries, the creditors rights are more strictly enforced in case of financial distresses.
  - Germany: Secured creditors can recover their claims even after bankruptcy filing.
  - UK: Secured creditors can appoint their own receiver.

Table VI

The Allocation of the Pre-Tax Dollar to Various Routes and Changes in the Allocation Over Time

The aggregate interest expense, dividends, and earnings for an economy are computed by summing the individual firm values across firms. The share of a pre-tax dollar paid to debt in the economy is the interest paid (all variables are aggregates) divided by income before interest and taxes. The share of a pre-tax dollar paid through dividends is the dividends paid grossed up to a pre-tax value divided by income before interest and taxes. The dividends are grossed up to a pre-tax value by multiplying by earnings after interest and before taxes and dividing by earnings after interest and after taxes. The share of a pre-tax dollar retained is one minus the share paid to debt minus the share paid in dividends.

	United States		Japan		Germany		France		Italy		United Kingdom		Canada	
	1982–1984	1989–1991	1982–1984	1989–1991	1982–1984	1989–1991	1982–1984	1989–1991	1982–1984	1989–1991	1982–1984	1989–1991	1982–1984	1989–1991
Share of a pre-tax dollar paid through the route														
Debt	0.26	0.40	0.46	0.43	0.33	0.25	0.57	0.39	0.68	0.62	0.21	0.23	0.42	0.52
Dividends	0.39	0.38	0.16	0.18	0.37	0.32	0.32	0.21	0.18	0.27	0.26	0.38	0.35	0.50
Capital Gains	0.35	0.21	0.38	0.39	0.30	0.42	0.11	0.40	0.14	0.11	0.53	0.40	0.23	−0.02
Route most tax advantaged by tax reforms between 1983 and 1990[a]	Debt		Debt		Retained earnings		Dividends		Dividends		Dividends		Debt	
Route least tax advantaged by tax reforms between 1983 and 1990[a]	Retained earnings		Dividends		Debt		Debt		Debt		Retained earnings		Dividends	
Change in share of pre-tax dollar flow between 1982–1984 and 1989–1991 allocated by companies consolidated and reporting throughout to route most tax advantaged	0.14		−0.03		0.12		−0.11		0.09		0.12		0.10	
Change in share of pre-tax dollar flow between 1982–1984 and 1989–1991 allocated by companies consolidated and reporting throughout to route least tax advantaged	−0.14		0.02		−0.07		−0.18		−0.06		−0.13		0.15	

[a] From Table V under the assumption that capital gains tax is paid at the statutory rate.