

## Financial Life Cycle and Capital Structure

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### Abstract

In this study, I present evidence of a distinctive inverted-U-shaped relation between leverage and financial life cycle stage. By using the magnitude of retained earnings (RE) as a proxy for a firm's life cycle stage, I find that the debt-to-equity ratio tends to be low for low-RE firms, high for medium-RE firms, and low for high-RE firms in all seven major countries under study. My evidence suggests that (i) early-stage firms have low leverage because they rely mostly on equity financing as a result of financial constraints, (ii) growth-stage firms have high leverage because they actively use debt to meet funding requirements for growth, and (iii) mature-stage firms have low leverage because they passively accumulate internal equity. Finally, it appears that this inverted-U-shaped relation is related to the free-cash-flow problem for high-RE firms in that, despite relatively slow growth prospects, those firms engage in heavy capital investments using large operating cash flows.

*JEL classification:* G32; G35

*Key words:* Capital structure; Financial life cycle; Retained earnings

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## 1. Introduction

A central question in corporate finance is whether optimal capital structure exists. The trade-off theory of capital structure postulates that firms choose leverage by balancing benefits and costs of using debt. These benefits and costs include the tax savings effects and financial distress (Modigliani and Miller, 1963), and agency costs (Jensen and Meckling, 1976). On the other hand, the pecking order model suggests that firms do not seek to maintain a particular leverage, and postulates that, due to adverse selection costs, firms prefer internal financing and prefer debt to equity when external financing is raised (Myers and Majluf, 1984).

The purpose of the present study is to examine whether firms' capital structure decisions may vary over their financial life cycle. Specifically, I use retained earnings as a proxy for a firm's financial life cycle stage and explore whether the magnitude of the use of debt varies for different levels of retained earnings. It is not a new idea that a firm's life cycle may consist of several stages, for example, (i) pioneering, (ii) expansion, (iii) maturity and (iv) decline. However, the concept of life cycle is rarely applied to corporate finance issues.<sup>1</sup>

My empirical investigation proceeds as follows. I collect firm-level data for the fiscal year 2005 for firms in seven major countries—Australia, Canada, France, Germany, Japan, the U.K. and the U.S. Then I divide firms in each country into deciles or quintiles according to the level of retained earnings and evaluate whether the debt-to-equity ratio is related to retained earnings.

My findings show that there is a distinctive inverted-U-shaped relation between leverage and retained earnings (RE). Across countries, the debt-to-equity ratio tends to be low for low-RE firms, high for medium-RE firms, and low for high-RE firms. Multiple regression analyses also reveal that even after accounting for the effects of previously identified cross-sectional determinants of leverage, there is a significant tendency for leverage to be low first, to go up and then finally to decrease as retained

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<sup>1</sup> A salient exception is DeAngelo, DeAngelo and Stulz (2006). These authors use retained earnings as a proxy for a firm's financial life cycle stage and document evidence that a firm's decision to pay dividends is affected by its financial life cycle stage.

earnings increase. Interestingly, a couple of alternative proxies for a firm's life cycle stage, such as firm age and firm size, do not display similar inverted-U-shaped relations with leverage. Their relations with leverage are mostly linear and monotonic. Thus, it appears that the inverted-U-shaped relation between leverage and retained earnings is quite unique.

In order to determine the nature of the inverted-U-shaped relation between leverage and retained earnings, I analyze whether firms grow at different rates and how their growth is financed over their financial life cycle. The results suggest that firms' growth and financing mode are indeed associated with financial life cycle. Low-RE firms grow slowly by relying mostly on equity financing because they are financially constrained as a result of their low profitability and slow growth. Medium-RE firms grow fast and actively use debt financing. Finally, the growth of high-RE firms is relatively slow while those firms enjoy large amounts of internal financing.

My additional analyses indicate that the inverted-U-shaped relation between leverage and retained earnings may be a reflection of several unique characteristics of high-RE firms. Firms in high retained earnings deciles are more profitable than those in other deciles, suggesting that high-RE firms tend to be extremely profitable. In contrast, their sales do not grow as fast as medium-RE firms, which is consistent with the view that high-RE firms are mature-stage firms. Despite their relatively slow growth, however, those high-RE firms engage in relatively large capital expenditures and sit on relatively large cash holdings, as compared to medium-RE firms. In sum, it appears that extremely high profitability, combined with relatively slow growth, allows high-RE firms to sustain low leverage and to accumulate cash holdings to spend for capital expenditures.

The most important implication of the above findings for capital structure theories is that the pecking order has substantial influences on firms' capital structure decisions over firms' financial life cycle. For example, because mature-stage firms (i.e., high-RE firms) generate large amounts of internal funds while their growth is slow, their leverage is low. Growth-stage firms (i.e., medium-RE firms) generate large amounts of

internal funds as well but their internal funds fall short of funding requirements to achieve high growth. Those firms rely heavily on debt financing to make up for funding shortfalls. Early-stage firms (i.e., low-RE firms) do not generate sufficient internal funds and use mostly equity financing due to financial constraints. These observations are consistent with the view that firms prefer to use internal funds first, followed by debt and equity.

The contribution of the present study to the capital structure literature can be described as follows. First, the present study identifies a key cross-sectional determinant of leverage, namely, retained earnings (i.e., financial life cycle stage), that prior studies have not discovered. Overall, there is strong evidence that firms' capital structure decisions are affected by where they are located in their financial life cycle. In particular, the evidence suggests that firms may go through three distinctive stages—equity-dependent, debt-dependent and internal-financing-dependent stages—over their financial life cycle with respect to leverage.<sup>2</sup>

Second, the present study unveils the presence of a special group of firms, namely, high-RE firms, that have unique characteristics. It appears that high-RE firms are severely under-levered, given that, as compared to medium-RE firms, those firms are highly profitable but use very little debt, thereby not taking advantage of tax shield benefits. Furthermore, their capital expenditures are high though the pace of their revenue growth is slow. These observations raise the possibility that the free-cash-flow problems are most serious in high-RE firms.

The organization of the rest of the paper is as follows. The next section describes the data. Section 3 conducts empirical analyses and presents results. Section 4 concludes the paper.

## **2. Data**

The source of my data is the *Worldscope* database. The sample is comprised of seven major countries—Australia, Canada, Japan, France, Germany, the U.K. and the

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<sup>2</sup> According to DeAngelo, DeAngelo and Stulz (2006), the financial life cycle consists of two stages—that is, capital infusion and payout stages—with respect to corporate payout policy.

U.S. These countries have the largest stock markets among developed countries. In constructing the sample, I begin by collecting data for every firm that is covered by the database, except for ADRs and foreign firms. I exclude firms in financial and utilities industries.

The main leverage variable in this study is the ratio of the long-term debt and equity (DER). To capture where a firm is located in its financial life cycle stage, I use the level of retained earnings scaled by total assets (RE). I also use several firm-characteristic variables that prior studies identify as determinants of leverage. Table A1 provides definitions for these variables. To address the problem of extreme observations, I Winsorize these variables at the top and bottom two percentiles of their respective distributions.

### **3. Empirical Results**

#### *3.1. Inverted-U-shaped relation between retained earnings and leverage*

I start off with a graphical illustration of an inverted-U-shaped relation between leverage and retained earnings. I divide all individual firms in a given country for the year 2005 into deciles by retained earnings (RE) and calculate the median value for the leverage ratio (DER) for each decile. Then I plot the median leverage ratios for these deciles.

Figure 1 graphs the relation between leverage and retained earnings for each of the seven major countries under study. It reveals that, without exception in all seven countries, there is an inverted-U-shaped relation between leverage and retained earnings. That is, firms with low retained earnings use little debt, but as retained earnings rise, firms gradually increase the use of debt and then beyond a certain point, they begin to decrease the use of debt. This analysis gives an indication that firms may go through three distinct stages of capital structure as their retained earnings change.

#### *3.2. Quadratic regression model*

In this section, I estimate a formal regression model to evaluate the presence of

an inverted-U-shaped relation between leverage and retained earnings. The dependent variable in the regression is the leverage ratio (DER). This regression model includes two variables related to firms' life cycle stage: retained earnings (RE/TA) and the squared value of retained earnings (RE/TA<sup>2</sup>).

Before exploring the nonlinear relation between leverage and retained earnings, I estimate a Tobit regression model on leverage using previously identified determinants of leverage as explanatory variables. In following Rajan and Zingales (1995) and Baker and Wurgler (2002), I use four determinants of leverage: firm size (LOGSALE) the market-to-book ratio (M/B), operating profitability (EBITDA), and the fixed-assets-to-total-assets ratio (PPE).

Table 1 reports the results for the estimated Tobit regression model for each of the seven countries under study. The estimated coefficients for the four determinants are in line with Rajan and Zingales (1995) and Baker and Wurgler (2002). For example, leverage is significantly and positively related to firm size (LOGSALE) and the fixed-assets-to-total-assets ratio (PPE) in all countries, while it is significantly and negatively related to operating profitability (EBITDA) in all but Germany. However, leverage is not consistently related to MBR across countries. The coefficient for MBR is negative for some countries but is positive for others.

Table 2 reports the results for the estimated regression model with the two additional explanatory variables that represent firms' financial life cycle stage. Inspection of the table shows that, in all countries, the coefficient for the squared value of retained earnings (RE\_DEC<sup>2</sup>) is significantly negative, while the coefficient for retained earnings (RE\_DEC) is positive. Thus, the results indicate the presence of a significant inverted-U-shaped relation between leverage and retained earnings even after the effects of key determinants of leverage are controlled for.

### *3.3. Leverage and other proxies for financial life cycle stage*

Prior studies use several alternative proxies for the corporate life cycle, for example, firm age and firm size. It deserves analyzing whether these alternative proxies

for the corporate life cycle display inverted-U-shaped relations with leverage.

Figure 2 shows that these alternative proxies, firm age and firm size, are strongly related to leverage. However, their relations with leverage are rather monotonic. There is little evidence that old firms and large firms tend to use less debt than middle-age and mid-size firms, respectively. These findings indicate that the inverted-U-shaped relation between leverage and retained earnings may be quite unique.

#### *3.4. Asset growth rate and its components over financial life cycle*

In this section, I analyze whether firms grow at different rates and how their growth is financed over their financial life cycle. This analysis allows us to determine the nature of the inverted-U-shaped relation between leverage and retained earnings.

To conduct the analysis, I divide the sample firms in each country during the year 2005 into quintiles according to the level of retained earnings (RE). Then for each quintile of firms, I calculate the one-year asset growth rate (i.e.,  $G\_TA = (TA(0) - TA(-1)) / TA(-1)$ ). Given that a firm's asset growth can be financed through either debt issuance, equity issuance or retained earnings, I also compute three components of asset growth for each quintile of firms: (i) debt issue (DEBTISS), (ii) equity issue (EQTISS) and (iii) the change in retained earnings (C\_RE).

Table 3 presents the median values for asset growth rate and its three components for each quintile of firms in the seven major countries. Inspection of the table reveals that firms go through three distinctive stages as their retained earnings increase. For example, in Canada, the median asset growth rate ( $G\_TA$ ) for firms in the first quintile (i.e., low-RE firms) is only 0.07%, but this median growth rate increases to 34.27% for firms in the third quintile (i.e., medium-RE firms) and then drops to 6.94% for firms in the fifth quintile (i.e., high-RE firms). Firms in other countries exhibit similar patterns. It appears that this inverted-U-shaped pattern for asset growth rate across different levels of retained earnings mimics the inverted-U-shaped relation between leverage and retained earnings.

In addition, the table shows that financing for asset growth goes through three

distinctive stages as well. First, there is a tendency for low-RE firms rely mostly on equity issues to raise capital. Across countries, the median value for equity issue (EQTISS) is greater for the firms in the first or second quintile than it is for the firms in higher quintiles. Second, it appears that medium-RE firms tend to issue debt more than those firms in the lowest or highest quintile. In many countries, the median value for debt issue (DEBTISS) in the second, third or fourth quintile is greater than it is for the first or fifth quintile. Third, high-RE firms exhibit heavy reliance on internal financing. Across countries, firms in the highest quintile have the greater median value for the change in retained earnings (C\_RE) than do other firms. The heavy reliance of retained earnings by these highest-retained-earnings firms is in contrast to the relative absence of their debt and equity issuances.

In sum, my findings suggest that firms' growth and financing mode are associated with financial life cycle. Specifically, low-RE firms grow slowly and rely mostly on equity financing. Medium-RE firms grow fast and actively use debt financing. Finally, high-RE firms' growth is relatively slow and those firms enjoy large amounts of internal financing.

### *3.5. Variation of key firm characteristics over financial life cycle*

Thus far the analyses provide evidence that is consistent with the hypothesis that firms' capital structures vary over their financial life cycle. Based on the evidence, I formulate a theory as to how firms' choice of capital structure is affected by where they are located in their financial life cycle. Figure 3 outlines this theory.

To elaborate, I postulate that low-RE firms cannot afford high leverage as a result of their low growth and low profitability. In a way, they face financial constraints in the sense that they are constrained to rely on equity financing. Medium-RE firms are heavy users of debt because they are profitable and also grow fast. Finally, high-retained-earnings firms use little leverage because they generate sufficient amounts of operating cash flows to meet funding requirements.

In order to validate these postulations, I choose four additional firm



characteristics variables—EBITDA, the five-year sales growth (SGR5Y), capital expenditures (CAPEX), and cash holdings (CASH)—and examine the variation of these variables across different levels of retained earnings.

Figure 3 documents that operating cash flow (EBITDA) goes up monotonically with retained earnings. On the other hand, sales growth (SGR5Y) tends to increase for low levels of retained earnings but to decrease for high levels of retained earnings. This observation is consistent with the view that low-, medium-, high-RE firms are early-, growth-, and mature-stage firms, respectively. Interestingly, the relation between CAPEX and retained earnings indicates that high-RE firms have large capital expenditures despite the fact that their revenue is not growing fast. The last graph on CASH and retained earnings shows that firms in the highest retained-earnings decile tends to hold large amounts of cash, as compared to firms in the mid-level retained earnings deciles.<sup>3</sup>

According to these findings, low-RE firms may be financially constrained as a result of their low profitability and low growth, which explains why those firms are mostly equity-dependent. It appears that medium-RE firms generate large amounts of operating cash flows but their internal funds may fall short of funding requirements due to high asset and revenue growth. They rely heavily on debt to fund growth. Finally, high-RE firms have several interesting characteristics. Those firms are more profitable than firms in other deciles, suggesting that high-RE firms tend to be extremely profitable. Despite their relatively slow growth, however, those high-RE firms have relatively large capital expenditures and sit on relatively large cash holdings, as compared to medium-RE firms. I conjecture that extremely high profitability, combined with relatively slow growth, allows high-RE firms to sustain low leverage and to accumulate cash holdings to spend for capital expenditures.

#### **4. Concluding remarks**

In this study, I present evidence of a distinctive inverted-U-shaped relation

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<sup>3</sup> To save space, I show these relations only for U.S. firms. Firms in other major countries display similar patterns.

between leverage and financial life cycle stage. By using the magnitude of retained earnings (RE) as a proxy for a firm's life cycle stage, I find that the debt-to-equity ratio tends to be low for low-RE firms, high for medium-RE firms, and low for high-RE firms in all seven major countries under study. My findings suggest that (i) early-stage firms have low leverage because they rely mostly on equity financing as a result of financial constraints, (ii) growth-stage firms have high leverage because they actively use debt to meet funding requirements for growth, and (iii) mature-stage firms have low leverage because they passively accumulate internal equity. These observations imply that the pecking order has substantial influence on firms' capital structure decisions over their financial life cycle. Finally, this inverted-U-shaped relation may be related to the free-cash-flow problem for high-RE firms in that, despite relatively slow growth prospects, those firms engage in heavy capital investments using large operating cash flows.

## Appendix

### Table A1

#### Description of key variables

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##### Leverage variables

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Debt-to-equity ratio (DER)

End-of-the-year long-term debt / end-of-the-year book value of equity

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##### Financial life cycle variables

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Retained-earnings-to-total-assets ratio (RE)

End-of-the-year retained earnings/end-of-the-year total assets

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Retained-earnings-to-total-assets ratio decile (RE\_DEC)

The decile value for RE

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The squared value of retained-earnings-to-total-assets ratio decile (RE\_DEC<sup>2</sup>)

RE\_DEC<sup>2</sup>

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##### Control variables

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Firm size (LOGSALE)

The logarithm of U.S. dollar value of net sales

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Market-to-book ratio (MBR)

Beginning-of-the-year value of (total assets – book value of equity + market value of equity)/total assets

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Fixed-assets-to-total-assets ratio (PPE)

(End-of-the-year property, plant and equipment / end-of-the-year total assets) × 100

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Operating profitability (EBITDA)

(Earnings before interest, taxes, depreciation and amortization / beginning-of-the-year total assets) × 100

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**Table 1****Tobit regression for leverage and its determinants**

This table reports the results of Tobit regressions. Our dataset comprises firm-level observations from seven major countries for the year 2005. The dependent variable is the debt-to-equity ratio (DER). The definitions of the explanatory variables are provided in Table A1. All dependent and explanatory variables are Winsorized at the first and the 99<sup>th</sup> percentiles before the estimation of the regression model. \*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. The numbers in parentheses are standard errors. N is the number of observations. -2·Log is -2 times log likelihood ratio.

	Australia	Canada	France	Germany	Japan	UK	US
LOGSALE	7.49*** (0.71)	7.33*** (0.70)	4.46*** (0.74)	4.60*** (0.76)	4.05*** (0.38)	6.00*** (0.57)	5.49*** (0.33)
MBR	-3.07** (1.28)	-1.30 (0.95)	-4.43*** (1.72)	0.12 (1.52)	1.17** (0.49)	-2.44*** (0.87)	-3.49*** (0.40)
EBITDA	-0.18** (0.09)	-0.24*** (0.08)	-0.45*** (0.16)	-0.06 (0.13)	-0.79*** (0.07)	-0.17** (0.08)	-0.22*** (0.04)
PPE	0.26*** (0.06)	0.17*** (0.05)	0.37*** (0.11)	0.52*** (0.09)	0.67*** (0.03)	0.34*** (0.05)	0.44*** (0.03)
N	383	451	348	358	2590	697	2463
-2·Log	-1375.2	-1605.5	-1546.2	-1356.6	-9843.2	-2428.3	-8711.0

**Table 2****Tobit regression for nonlinear relation between leverage and retained earnings**

This table reports the results of Tobit regressions. Our dataset comprises firm-level observations from seven major countries for the year 2005. The dependent variable is the debt-to-equity ratio (DER). RE\_DEC is the decile value for retained-earnings-to-total-assets ratio and RE\_DEC^2 is the squared value of RE\_DEC. The definitions of these and other explanatory variables are provided in Table A1. All dependent and explanatory variables are Winsorized at the first and the 99<sup>th</sup> percentiles before the estimation of the regression model. \*, \*\* and \*\*\* indicate significance at the 10%, 5% and 1% levels, respectively. The numbers in parentheses are standard errors. N is the number of observations. -2·Log is -2 times log likelihood ratio.

	Australia	Canada	France	Germany	Japan	UK	US
RE_DEC	11.05*	2.45	4.47*	8.46***	-2.59***	11.29***	6.44***
	(2.85)	(2.45)	(2.36)	(2.41)	(0.75)	(2.08)	(1.25)
RE_DEC^2	-1.03***	-0.35*	-0.67***	-0.91***	-0.28***	-1.18***	-0.75***
	(0.23)	(0.20)	(0.21)	(0.20)	(0.07)	(0.17)	(0.10)
LOGSALE	7.08***	7.91***	4.39***	5.21***	3.82***	6.05***	5.86***
	(0.80)	(0.75)	(0.74)	(0.79)	(0.32)	(0.57)	(0.35)
MBR	-1.45	-1.34	-2.03	1.44	-0.52	-1.86**	-3.06***
	(1.24)	(0.95)	(1.72)	(1.42)	(0.42)	(0.84)	(0.40)
EBITDA	-0.16*	-0.17*	0.04	-0.09	0.05	-0.11	-0.14***
	(0.10)	(0.09)	(0.20)	(0.13)	(0.07)	(0.09)	(0.05)
PPE	0.28***	0.15***	0.39***	0.56***	0.58***	0.36***	0.45***
	(0.06)	(0.05)	(0.10)	(0.09)	(0.03)	(0.05)	(0.03)
N	382	445	346	354	2587	696	2446
-2·Log	-1359.0	-1575.9	-1523.8	-1325.4	-9376.7	-2386.9	-8586.4

**Table 3****Components of growth of total assets**

For seven major countries, table reports the median value for the growth rate of total assets and its three components for firms with different levels of retained earnings for the year 2005. RE # = 1,2,3,4 and 5 are the quintiles of firms classified by the retained-earnings-to-total-assets ratio (RE). G\_TA is the one-year growth rate of total assets (i.e.,  $TA(0) - TA(-1) / TA(-1)$ ). Three components of G\_TA is (i) debt issue (DEBTISS), i.e., the amount of long-term debt issuance divided by  $TA(-1)$ ; (ii) equity issue (EQTISS), i.e., the amount of equity issuance divided by  $TA(-1)$ ; and (iii) the change in retained earnings (C\_RE), i.e., the difference in retained earnings over a year divided by  $TA(-1)$ . All numbers are expressed in percentages.

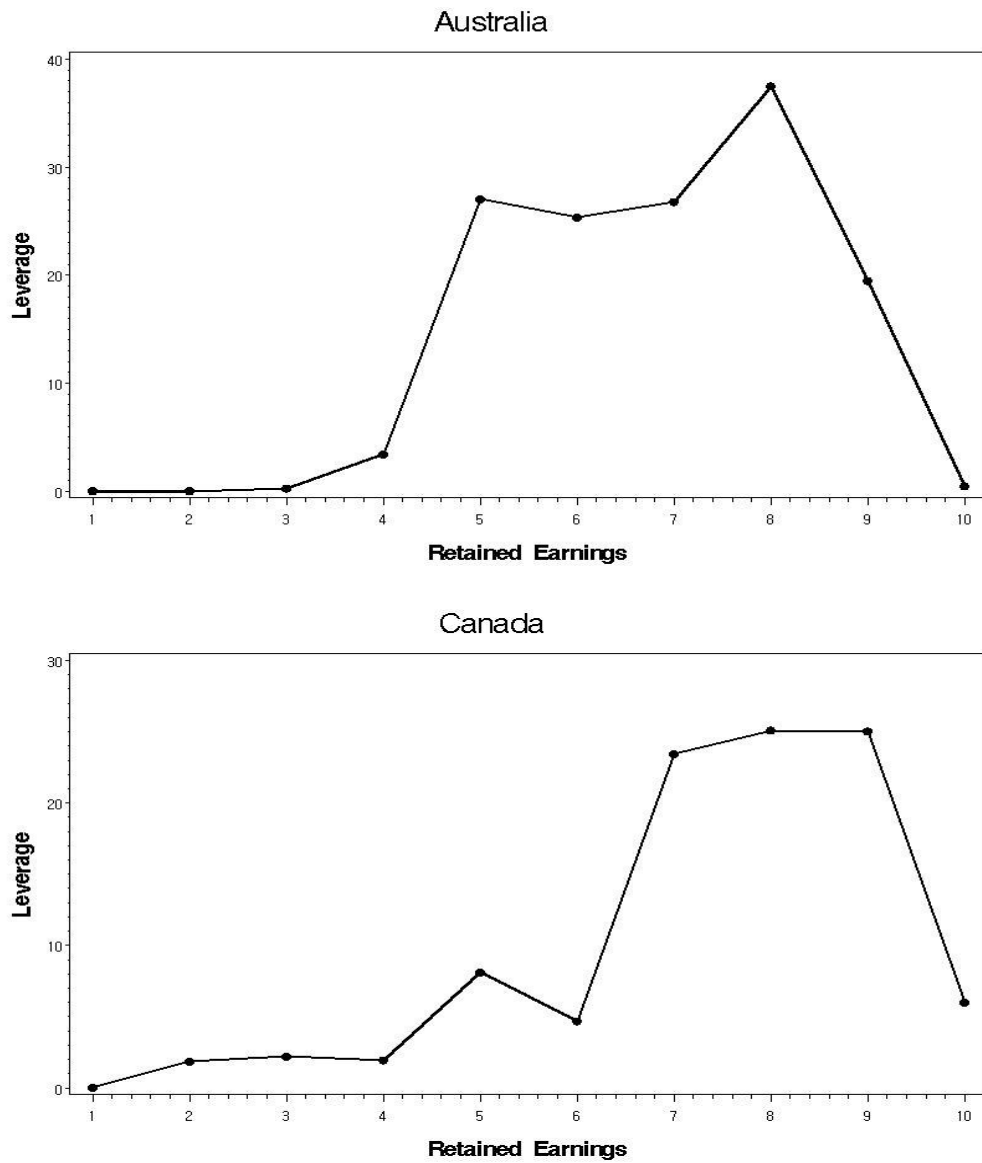
	RE #	N	G_TA	DEBTISS	EQTISS	C_RE
Australia	1	87	-0.70	0.00	19.08	-27.30
	2	87	5.62	0.00	4.75	-7.24
	3	87	17.33	11.75	2.03	0.79
	4	87	13.53	10.72	0.43	3.05
	5	87	14.39	0.35	0.21	6.72
Canada	1	109	0.07	42.51	8.72	-22.65
	2	109	14.43	0.00	11.38	-6.05
	3	110	34.27	90.06	9.91	0.82
	4	109	19.33	0.68	1.21	5.94
	5	109	6.94	0.82	0.27	6.02
France	1	85	3.92	1.48	0.07	-2.60
	2	86	11.19	4.02	0.04	0.45
	3	85	16.21	3.91	0.07	1.69
	4	86	15.99	2.54	0.05	2.30
	5	85	19.95	0.56	0.18	7.25
Germany	1	85	0.00	0.00	1.95	-2.85
	2	85	11.11	0.05	0.33	3.25
	3	86	11.73	4.06	0.02	2.68
	4	85	10.16	2.22	0.00	3.95
	5	85	9.24	0.38	0.00	6.20
Japan	1	582	2.08	3.98	0.00	1.27
	2	583	4.10	2.78	0.00	1.85
	3	582	4.26	1.33	0.00	2.38
	4	583	4.02	0.03	0.00	2.82
	5	582	3.90	0.00	0.00	3.13
UK	1	185	6.63	0.00	7.06	-18.83
	2	185	28.12	0.00	1.45	-2.83
	3	186	17.46	0.00	0.34	3.98
	4	185	16.48	0.00	0.18	4.83
	5	185	10.51	0.00	0.05	7.68
US	1	621	-2.49	0.00	8.51	-21.44
	2	621	9.99	0.00	2.42	-3.96
	3	621	12.47	0.00	1.11	3.84
	4	621	10.22	0.16	0.85	5.90
	5	621	7.30	0.00	0.87	7.26

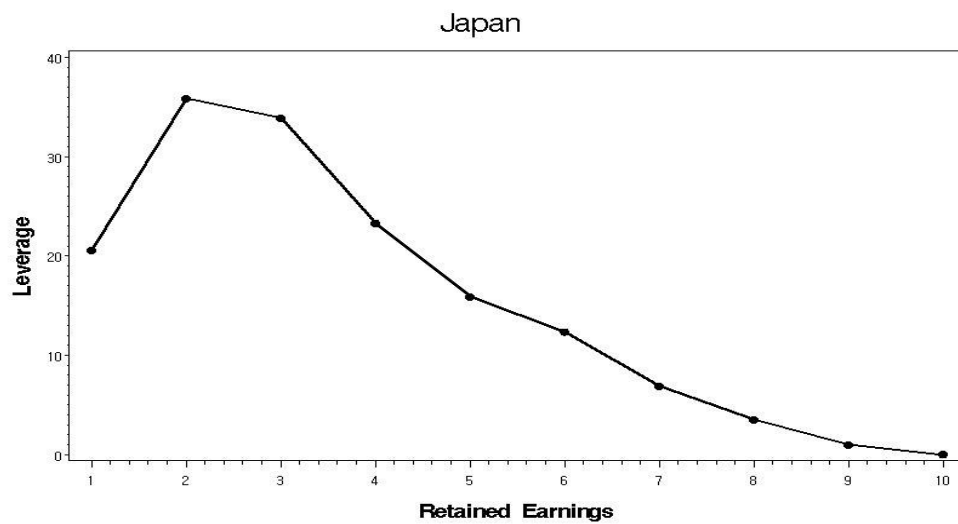
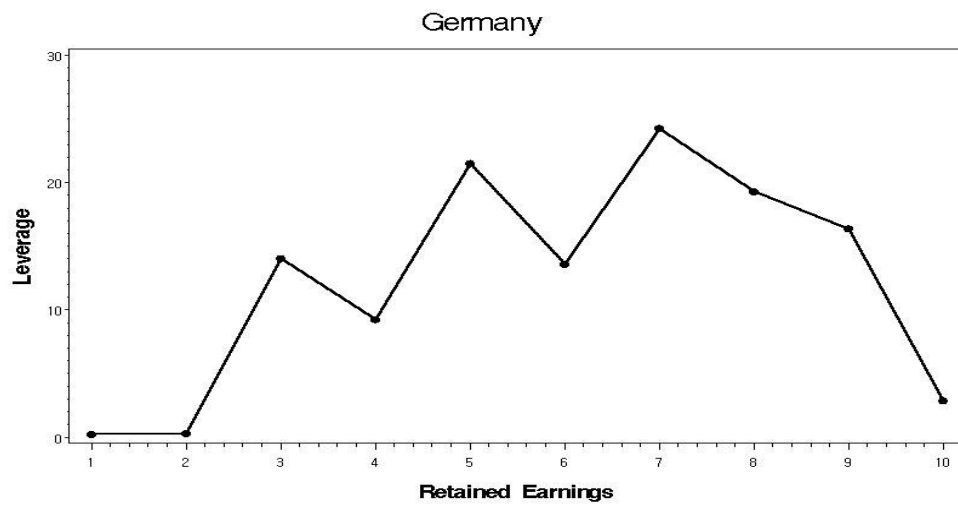
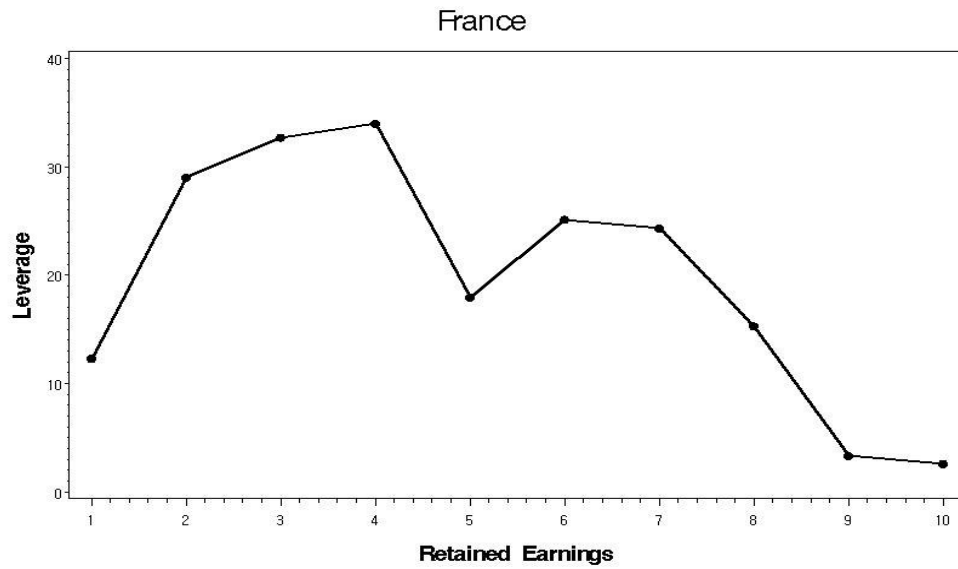


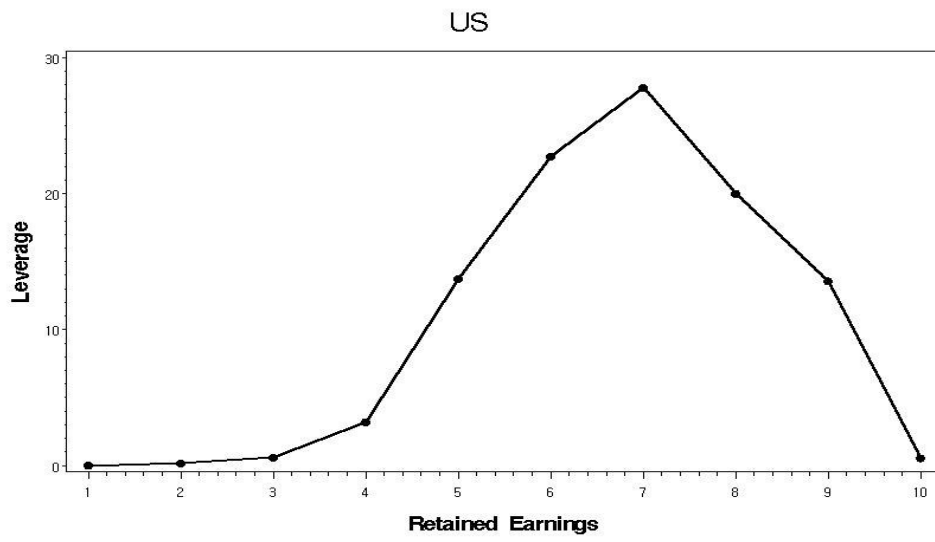
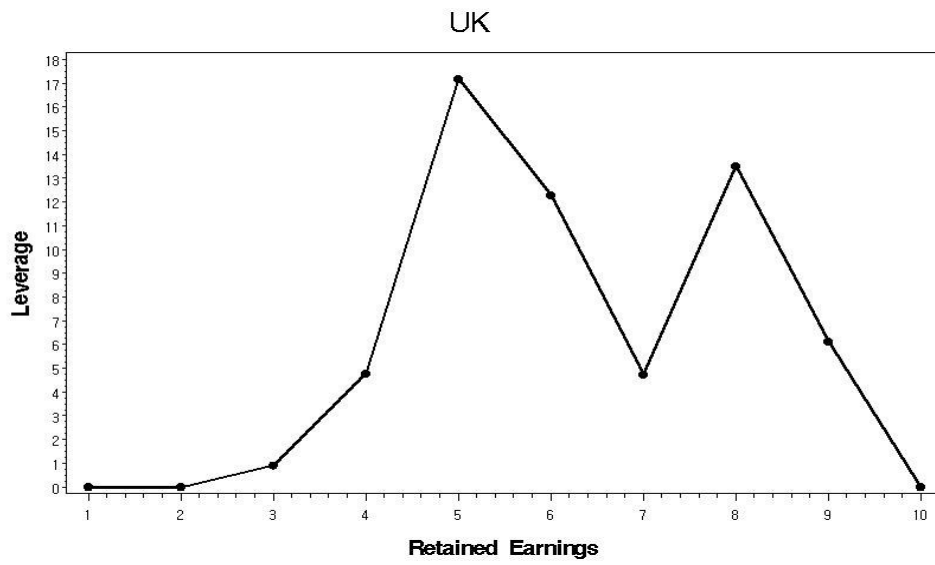
**Figure 1**

**Graphical illustration of the relation between leverage and retained earnings**

For seven major countries in our sample, these graphs plots the median value of leverage (measured by the debt-to-equity ratio; DER) for each decile of firms classified by the retained-earnings-to-total assets ratio (RE) for the year 2005. Leverage is expressed in percentages.



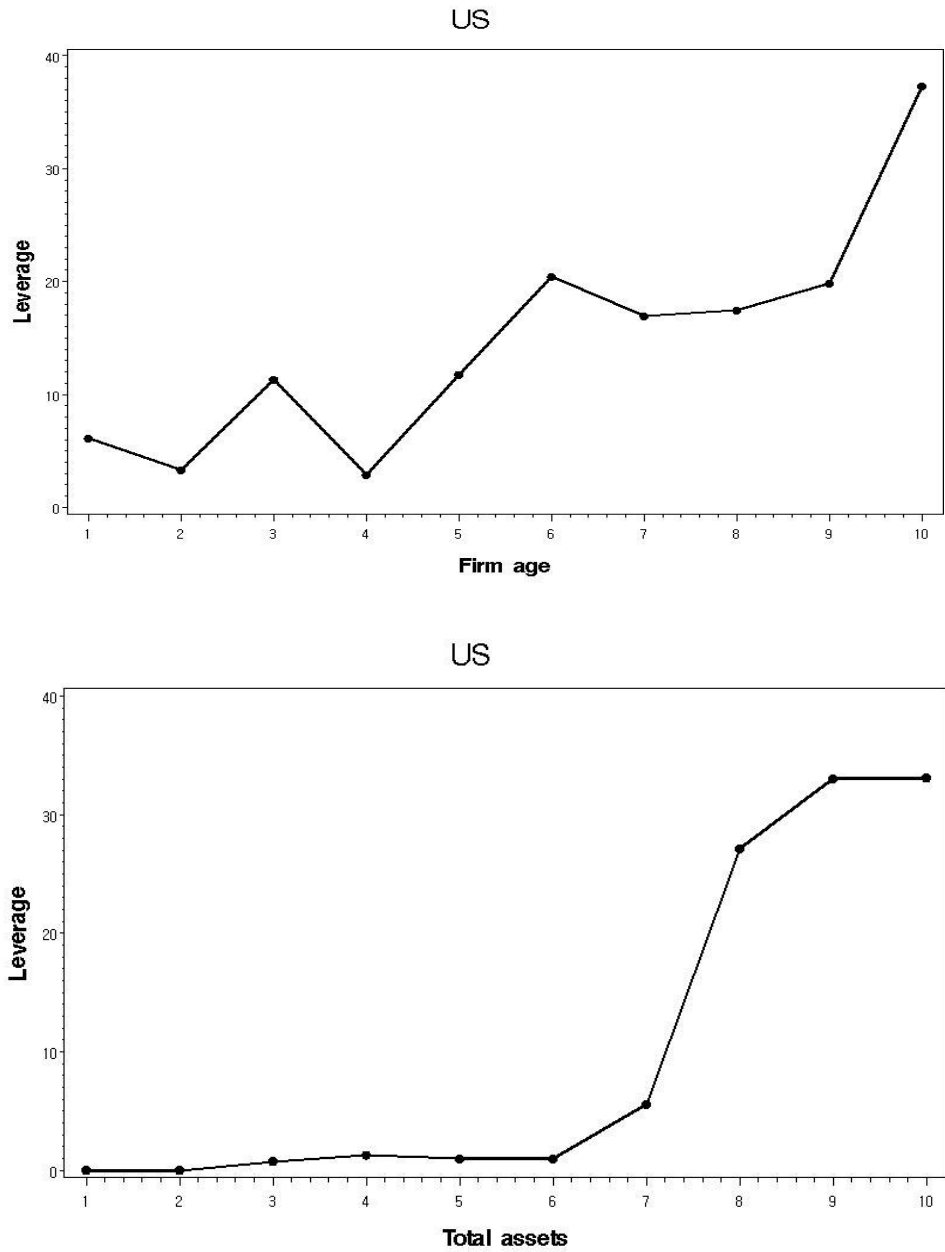




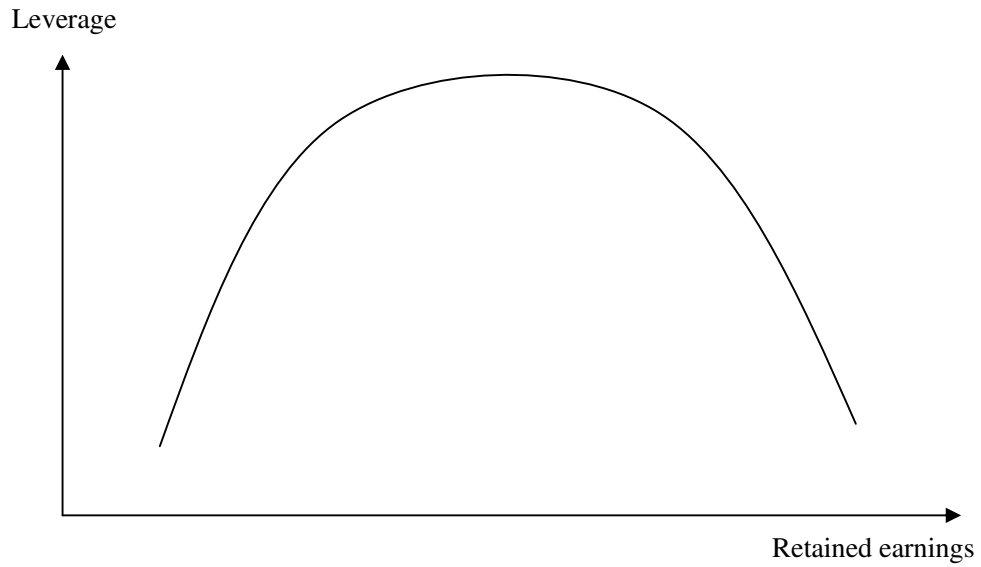
**Figure 2**

**Leverage and other proxies for life cycle stage**

For U.S. firms in the year 2005, these graphs plot the median value of leverage (measured by the debt-to-equity ratio; DER) for each decile of firms classified by two proxies for life cycle stage: (i) firm age (i.e., the number of years since the firm is listed on the exchange) and (ii) total assets. Leverage is expressed in percentages.



**Figure 3**  
**Financial life cycle theory of capital structure**



Low-RE firms:  
Rely on equity due to  
financial constraints  
(slow growth)

Medium-RE firms:  
Actively use debt to  
fund growth  
(high growth)

High-RE firms:  
Passively accumulate  
internal equity  
(slow growth)

**Figure 4**

**Variation of key firm characteristics over financial life cycle**

For U.S. firms in the year 2005, these graphs plot the median values for EBITDA, Sales growth (SGR5Y), capital expenditures (CAPEX) and cash holdings (CASH) for each decile of firms classified by the retained-earnings-to-total assets ratio (RE). EBITDA is earnings before interest, taxes, depreciation and amortization; SGR5Y is  $(\text{sales in year } (t) - \text{sales in year } (t-5)) / \text{sales in year } (t-5)$ ; CAPEX is capital expenditures; CASH is cash and short-term investments divided by total assets. EBITDA, CAPEX and CASH are scaled by total assets. EBITDA, SGR5Y and CASH are expressed in percentages.

