**Internet Appendix for**

**“How Stable Are Corporate Capital Structures?”\***

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**Figure IA.1. Stationary target leverage ratio models: Model-generated versus actual instability of the leverage cross section.** The thick solid black plot is of the *R2* values for the relations between pairs of cross sections (for the full sample) in the real data, per Figure 3 in the published article. The other plots are for the analogous *R2*s for the stationary target ratio models in Panel A of Table VI. The speed of adjustment (SOA) to the target leverage ratio is denoted

**Figure IA.2. Time-varying target leverage ratio models: Model-generated versus actual instability of the leverage cross section.** The thick solid black plot is of the *R2* values for the relations between pairs of cross sections (for the full sample) in the real data, per Figure 3 in the published article. The other plots are for the analogous *R2*s for the two time-varying target ratio models in Panel D of Table VI. Target means (TMs) are 0.200, 0.300, and 0.400 in the first model and 0.100, 0.200, 0.300, and 0.400 in the second model.

**Figure IA.3. Random leverage variation with no targeting behavior by firms: Model-generated versus actual instability of the leverage cross section.** The thick solid black plot is of the *R2* values for the relations between pairs of cross sections (for the full sample) in the real data, per Figure 3 in the published article. The *λ* = 0.00 plot is for a model with random variation in leverage and no targeting behavior by firms. The reflecting barriers plot is for a model in which leverage follows a Markov process with no leverage target and no path-dependent memory. In this model, shocks that would hypothetically place leverage below 0.000 or above 1.000 instead reflect leverage back into the interior of the [0.000, 1.000] interval. The absorbing barriers plot is for a similar model, except now shocks that would hypothetically place leverage below 0.000 or above 1.000 instead leave leverage at the relevant endpoint of the interval. In the body of the paper, Table VI shows that the reflecting barrier model offers a poor fit to the data due to unrealistically high variation error (*VE*).

**Table IA.I**

**Time-Series Range of Book Leverage, Market Leverage, and Net Debt Ratios of Publicly Held Industrial Firms**

Book leverage is the ratio of total debt to total assets. Market leverage is the ratio of debt to the sum of debt plus the market value of common stock. The net-debt ratio equals debt minus cash, divided by total assets. The sample contains 15,096 industrial firms in the CRSP/Compustat file over 1950 to 2008. The sample excludes firms (i) with SIC codes in the ranges 4900 to 4949 (utilities) or 6000 to 6999 (financials), (ii) incorporated outside the U.S., or(iii) without CRSP security codes of 10 or 11. A firm enters our sample in the first year that it has a nonmissing value for total assets on Compustat and a nonmissing share price on CRSP (or Compustat). It remains in the sample as long as Compustat continues to report nonmissing values of total assets and the firm’s shares have not been delisted. The constant-composition sample contains 157 firms that are included in the sample in 1950 and remain until at least 2000. Panels A and C exclude the 0.22% of firm-year observations with book leverage over 1.000, while Panel B excludes the 1.67% of firms (almost all from the two to four year group) with insufficient equity value data to measure the range of market leverage. The far right column gives the firm counts before these sample exclusions.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | % of firms with a range of leverage ratios in the interval: | | | | | |  |  |
| Years on  Compustat | Median  range | 0.000  to 0.100 | 0.100  to 0.200 | 0.200  to 0.300 | 0.300  to 0.400 | 0.400  to 0.500 | Above 0.500 | Median ratio | Number  of firms | |
| Panel A. Book leverage | | | | | | | | | | |
| 20-plus | 0.391 | 2.3% | 6.1% | 19.9% | 23.4% | 19.2% | 29.2% | 0.211 | 2751 | |
| 15 to 19 | 0.357 | 5.2% | 11.8% | 20.7% | 20.9% | 16.1% | 25.3% | 0.195 | 1514 | |
| 10 to 14 | 0.314 | 11.8% | 15.1% | 20.6% | 17.8% | 13.0% | 21.8% | 0.189 | 2408 | |
| 5 to 9 | 0.241 | 20.7% | 20.7% | 18.9% | 14.9% | 9.9% | 15.0% | 0.179 | 3740 | |
| 2 to 4 | 0.110 | 47.7% | 19.9% | 12.7% | 9.1% | 4.8% | 5.8% | 0.173 | 3779 | |
| 1 | --- | --- | --- | --- | --- | --- | --- | 0.158 | 904 | |
| Constant-comp sample | 0.400 | 0.0% | 1.3% | 15.9% | 32.5% | 24.8% | 25.5% | 0.208 | 157 | |
|  |  |  |  |  |  |  |  |  |  | |
| Panel B. Market Leverage | | | | | | | | | | |
| 20-plus | 0.536 | 3.5% | 5.3% | 8.0% | 12.4% | 15.4% | 55.4% | 0.221 | 2751 | |
| 15 to 19 | 0.462 | 9.1% | 8.1% | 10.5% | 13.6% | 14.9% | 43.8% | 0.167 | 1514 | |
| 10 to 14 | 0.393 | 14.3% | 10.9% | 12.3% | 13.7% | 12.7% | 36.2% | 0.159 | 2408 | |
| 5 to 9 | 0.294 | 23.5% | 14.3% | 13.1% | 13.3% | 11.5% | 24.4% | 0.128 | 3740 | |
| 2 to 4 | 0.117 | 46.9% | 16.7% | 12.7% | 8.3% | 6.0% | 9.4% | 0.098 | 3779 | |
| 1 | --- | --- | --- | --- | --- | --- | --- | 0.076 | 904 | |
| Constant-comp sample | 0.507 | 0.6% | 4.5% | 10.2% | 14.7% | 19.1% | 51.0% | 0.219 | 157 | |
|  |  |  |  |  |  |  |  |  |  | |
| Panel C. NetDebt Ratio | | | | | | | | | | |
| 20-plus | 0.599 | 0.0% | 1.0% | 5.4% | 12.3% | 15.5% | 65.9% | 0.135 | 2751 | |
| 15 to 19 | 0.574 | 0.3% | 2.5% | 9.1% | 12.5% | 15.1% | 60.4% | 0.098 | 1514 | |
| 10 to 14 | 0.527 | 0.4% | 5.2% | 12.6% | 14.6% | 13.9% | 53.4% | 0.086 | 2408 | |
| 5 to 9 | 0.424 | 2.8% | 11.6% | 15.8% | 16.0% | 13.5% | 40.3% | 0.071 | 3740 | |
| 2 to 4 | 0.250 | 21.9% | 20.4% | 15.0% | 12.1% | 8.7% | 21.9% | 0.038 | 3779 | |
| 1 | --- | --- | --- | --- | --- | --- | --- | -0.008 | 904 | |
| Constant-comp sample | 0.624 | 0.0% | 0.0% | 1.3% | 8.9% | 16.6% | 73.3% | 0.140 | 157 | |

**Table IA.II**

**Time-Series Standard Deviation ()of Book Leverage, Market Leverage, and NetDebt Ratios of Publicly Held Industrial Firms**

The time-series standard deviation of leverage,, is based on the maximum likelihood estimator, which uses a divisor equal to the number of observations, *N*, in each firm’s time series, not *N-1*. Column (3) reports the cross-sectional standard deviation of for all firms in the sample for the row in question. Column (4) reports the correlation between the time-series standard deviation of leverage and the range in leverage. Book leverage is the ratio of total debt to total assets. Market leverage is the ratio of debt to the sum of debt plus the market value of common stock. The netdebt ratio equals debt minus cash, divided by total assets. The sample contains 15,096 industrial firms in the CRSP/Compustat file over 1950 to 2008, with other sampling conditions as described in Table IA.I.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  | Cross-sectional | Correlation | % of firms with standard deviation in the interval: | | | | | |
| Years on | Average | Median | standard deviation of | between and range | 0.000  to 0.050 | 0.050  to 0.100 | 0.100  to 0.150 | 0.150  to 0.200 | 0.200  to 0.250 | Above 0.250 |
| Compustat | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Panel A. Book Leverage | | | | | | | | | | |
| 20-plus | 0.115 | 0.106 | 0.054 | 0.926 | 7.5% | 37.6% | 32.6% | 14.5% | 5.9% | 1.8% |
| 15 to 19 | 0.116 | 0.106 | 0.064 | 0.957 | 13.3% | 32.9% | 28.8% | 14.3% | 6.9% | 3.9% |
| 10 to 14 | 0.108 | 0.098 | 0.069 | 0.968 | 20.4% | 30.5% | 24.5% | 14.3% | 6.4% | 3.9% |
| 5 to 9 | 0.098 | 0.084 | 0.075 | 0.982 | 29.9% | 28.9% | 19.3% | 11.8% | 5.3% | 4.9% |
| 2 to 4 | 0.073 | 0.049 | 0.077 | 0.990 | 50.6% | 20.9% | 13.5% | 7.4% | 4.0% | 3.6% |
| Full sample | 0.098 | 0.088 | 0.072 | 0.941 | 27.6% | 29.2% | 22.3% | 11.9% | 5.4% | 3.7% |
| Constant-comp sample | 0.109 | 0.106 | 0.040 | 0.859 | 2.6% | 43.3% | 40.1% | 9.6% | 3.8% | 0.6% |
|  |  |  |  |  |  |  |  |  |  |  |
| Panel B. Market Leverage | | | | | | | | | | |
| 20-plus | 0.146 | 0.144 | 0.067 | 0.944 | 7.8% | 18.1% | 28.0% | 23.9% | 15.7% | 6.6% |
| 15 to 19 | 0.137 | 0.136 | 0.077 | 0.966 | 14.6% | 19.3% | 24.0% | 21.8% | 11.7% | 8.7% |
| 10 to 14 | 0.127 | 0.124 | 0.081 | 0.973 | 20.6% | 19.7% | 21.7% | 18.1% | 12.3% | 7.6% |
| 5 to 9 | 0.114 | 0.104 | 0.087 | 0.985 | 29.3% | 19.1% | 19.3% | 14.5% | 9.1% | 8.7% |
| 2 to 4 | 0.081 | 0.053 | 0.086 | 0.991 | 49.0% | 18.6% | 13.2% | 7.6% | 5.9% | 5.8% |
| Full sample | 0.117 | 0.110 | 0.085 | 0.952 | 27.0% | 18.9% | 20.4% | 16.0% | 10.4% | 7.4% |
| Constant-comp sample | 0.135 | 0.128 | 0.061 | 0.943 | 6.4% | 26.1% | 33.1% | 21.0% | 8.9% | 4.5% |
|  |  |  |  |  |  |  |  |  |  |  |
| C. NetDebt Ratio | | | | | | | | | | |
| 20-plus | 0.167 | 0.153 | 0.076 | 0.925 | 1.0% | 17.3% | 30.1% | 23.9% | 13.8% | 14.0% |
| 15 to 19 | 0.180 | 0.161 | 0.093 | 0.957 | 2.1% | 16.1% | 26.4% | 21.4% | 14.5% | 19.6% |
| 10 to 14 | 0.175 | 0.156 | 0.095 | 0.967 | 3.1% | 19.3% | 25.1% | 19.8% | 13.7% | 19.1% |
| 5 to 9 | 0.170 | 0.145 | 0.107 | 0.978 | 7.3% | 22.2% | 22.6% | 17.0% | 11.4% | 19.5% |
| 2 to 4 | 0.144 | 0.109 | 0.125 | 0.987 | 24.5% | 22.6% | 15.9% | 12.0% | 7.5% | 17.5% |
| Full sample | 0.164 | 0.143 | 0.104 | 0.919 | 9.3% | 20.2% | 23.1% | 18.0% | 11.6% | 17.8% |
| Constant-comp sample | 0.159 | 0.153 | 0.059 | 0.882 | 0.0% | 16.6% | 33.1% | 28.0% | 15.3% | 7.0% |

**Table IA.III**

**Median Time-Series Correlation Between Book Leverage and Market Leverage:**

**Publicly Held Industrial Firms Partitioned by Range of Book Leverage**

Book leverage is the ratio of total debt to total assets. Market leverage is the ratio of debt to the sum of debt plus the market value of common stock. For a given firm, the correlation between book and market leverage is calculated based on all sample years with nonmissing values of both leverage ratios. The column partitions and row definitions are identical to those for book leverage in Panel A of Table IA.I. The sample inputs are identical to those for Table IA.I, with attention restricted to firms with at least two years of data in order to obtain meaningful correlation estimates.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Median correlation between book and market leverage | | | | | | |
|  | among firms with book leverage in the interval: | | | | | | |
| Number of years listed | All firms in row | 0.000to 0.100 | 0.100to 0.200 | 0.200to 0.300 | 0.300to 0.400 | 0.400to 0.500 | Above 0.500 |
| 20-plus | 0.820 | 0.958 | 0.824 | 0.794 | 0.808 | 0.822 | 0.832 |
| 15 to 19 | 0.842 | 0.948 | 0.828 | 0.831 | 0.844 | 0.827 | 0.845 |
| 10 to 14 | 0.857 | 0.947 | 0.795 | 0.818 | 0.861 | 0.871 | 0.858 |
| 5 to 9 | 0.885 | 0.898 | 0.840 | 0.868 | 0.893 | 0.916 | 0.905 |
| 2 to 4 | 0.986 | 0.994 | 0.972 | 0.983 | 0.983 | 0.984 | 0.988 |
|  |  |  |  |  |  |  |  |
| Constant-composition sample | 0.787 | --- | 0.741 | 0.743 | 0.767 | 0.807 | 0.790 |
|  |  |  |  |  |  |  |  |
| Full sample | 0.878 | 0.959 | 0.876 | 0.856 | 0.864 | 0.871 | 0.871 |
|  |  |  |  |  |  |  |  |

**Table IA.IV**

**Intertemporal Variation in Book Leverage:**

**Magnitude and Speed of Departure from Original Leverage**

Leverage is measured as the book value of total debt divided by the book value of total assets. The sample consists of 2,751 firms with 20 or more years of datain the CRSP/Compustat file over 1950 to 2008. The first column indexes event years relative to the date of the first leverage observation (at event year 0) for each firm in the sample. The remaining four columns give the fraction of sample firms that, at some point up to the event date in question, has had a *Debt/TA* ratio outside the specified interval. For example, the first entry in the third row indicates that, as of three years after each firm’s initial leverage observation, 71.1% of sample firms have had a leverage ratio that is more than 0.050 above (or more than 0.050 below) the leverage ratio that the firm had in year 0.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | % of firms for which *Debt/TA*has differed from its original value by at least: | | | | |
| Year | +/- 0.050 | +/- 0.100 | +/- 0.200 | +/- 0.300 | +/- 0.400 |
| 1 | 41.1% | 21.7% | 7.0% | 2.6% | 1.0% |
| 2 | 61.3% | 37.0% | 14.7% | 6.0% | 2.7% |
| 3 | 71.1% | 47.4% | 20.8% | 9.2% | 3.9% |
| 4 | 77.2% | 54.8% | 25.3% | 11.5% | 5.2% |
| 5 | 81.5% | 61.1% | 29.7% | 13.8% | 6.6% |
| 6 | 85.1% | 66.5% | 33.8% | 16.3% | 7.9% |
| 7 | 87.6% | 70.9% | 38.2% | 18.6% | 9.5% |
| 8 | 89.2% | 74.3% | 41.7% | 21.0% | 10.6% |
| 9 | 90.6% | 77.0% | 44.4% | 22.2% | 11.5% |
| 10 | 91.7% | 79.7% | 47.9% | 24.6% | 13.0% |
| 11 | 92.6% | 81.1% | 50.5% | 26.4% | 14.1% |
| 12 | 93.2% | 82.8% | 52.3% | 27.5% | 15.0% |
| 13 | 93.8% | 84.0% | 54.4% | 29.1% | 16.0% |
| 14 | 94.3% | 85.6% | 56.4% | 30.6% | 16.8% |
| 15 | 95.0% | 86.8% | 58.1% | 32.8% | 17.9% |
| 16 | 95.4% | 88.3% | 60.4% | 34.3% | 18.9% |
| 17 | 96.0% | 89.7% | 62.2% | 36.4% | 20.3% |
| 18 | 96.4% | 90.4% | 64.4% | 38.1% | 21.4% |
| 19 | 96.8% | 91.4% | 66.5% | 39.5% | 22.2% |

**Table IA.V**

**Length of Stable Leverage Regimes**

The first row in each panel defines a stable leverage regime as one in which the firm’s *Debt/Total Assets* ratio continuously remains in a range of values that differ by no more than 0.050. Each subsequent row in the same panel considers a successively broader (more lax) definition of a stable regime. The second row in each panel defines a stable leverage regime as one in which the firm’s *Debt/TA* range continuously differs by no more than 0.100, while the third and fourth rows in each panel define stable leverage regimes as instances in which *Debt/TA* continuously remains within ranges that differ by no more than 0.150 and 0.200 respectively. To generate the data in the table, we first take a given firm and identify its *longest* stable leverage regime (based on each given *Debt/TA* range definition of a stable regime). For example, to generate the data in the first row of Panel A, we take a firm that has been listed at least 20 years and calculate the longest number of consecutive years that its *Debt/TA* ratio remained within a range of values that differ by no more than 0.050. We repeat this process for all firms in the sample, and report the resulting histogram in this row, with the sample median given in the far-right column. To generate the numbers in the second row of Panel A, we follow the same procedure but now use 0.100 in place of 0.050 to identify stable leverage regimes. We repeat this process for each remaining row. Since some firms in the Panel A sample are listed less than the number of years specified in the column headers, some table entries are specified “n.m.” (not meaningful).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | % of firms with *Debt/TA* continuously in specified range for at least: | | | | Median # of years of longest stable regime |
|  | 10 years | 20 years | 30 years | 40 years |
| Panel A. Firms listed at least 20 years | | | | | |
| *Debt/TA* range ≤ 0.050 | 21.3% | 4.2% | n.m. | n.m. | 6.0 |
| *Debt/TA* range ≤ 0.100 | 50.3% | 9.9% | n.m. | n.m. | 10.0 |
| *Debt/TA* range ≤ 0.150 | 73.6% | 22.4% | n.m. | n.m. | 13.0 |
| *Debt/TA* range ≤ 0.200 | 85.7% | 36.9% | n.m. | n.m. | 17.0 |
| Panel B. Firms listed at least 40 years | | | | | |
| *Debt/TA* range ≤ 0.050 | 32.0% | 6.6% | 2.6% | 0.7% | 8.0 |
| *Debt/TA* range ≤ 0.100 | 75.4% | 20.2% | 5.9% | 1.6% | 13.0 |
| *Debt/TA* range ≤ 0.150 | 93.3% | 45.8% | 14.5% | 3.8% | 18.5 |
| *Debt/TA* range ≤ 0.200 | 97.8% | 69.0% | 32.7% | 9.9% | 24.0 |
| Panel C. Constant-composition sample: | | | | | |
| *Debt/TA* range ≤ 0.050 | 51.6% | 7.6% | 2.5% | 0.0% | 10.0 |
| *Debt/TA* range ≤ 0.100 | 94.9% | 28.0% | 7.6% | 1.3% | 16.0 |
| *Debt/TA* range ≤ 0.150 | 100.0% | 68.2% | 24.2% | 6.4% | 22.0 |
| *Debt/TA* range ≤ 0.200 | 100.0% | 87.9% | 51.0% | 14.6% | 30.0 |

**Table IA.VI**

**Stable Leverage Regimes and the Level of Leverage**

For each firm, we identify the longest stable leverage regime (as defined below), with PanelA analyzing stable regimes that last at least 20 years and Panel B analyzing those that last at least 10 years. The columns of the table sort firms according to the median value of the *Debt/TA* ratio during its longest stable regime, and report the percentage of firms (in the sample for the row in question) that falls in each specified leverage interval. The first row in each panel defines a stable leverage regime as one in which the firm’s *Debt/Total Assets* ratio continuously remains in a range of values that differ by no more than 0.050. Each subsequent row in the same panel considers a successively broader (more lax) definition of a stable regime. The second row defines a stable leverage regime as one in which the firm’s *Debt/TA* range continuously remains in a range of values that do not differ by more than 0.100, while the third and fourth rows define stable regimes as situations in which *Debt/TA* continuously remains within a range of values that do not differ by more than 0.150 and 0.200, respectively.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | % of firms with median *Debt/TA* during stable regime that falls in interval: | | | | | Number |
|  | 0.100 or less | 0.100 to 0.200 | 0.200 to 0.300 | 0.300 to 0.400 | 0.400 or higher | of firms |
| Panel A. Stable leverage regimes of 20 years or more | | | | | | |
| *Debt/TA* range ≤ 0.050 | 100.0% | 0.0% | 0.0% | 0.0% | 0.0% | 115 |
| *Debt/TA* range ≤ 0.100 | 78.8% | 7.3% | 11.0% | 1.8% | 1.1% | 273 |
| *Debt/TA* range ≤ 0.150 | 53.8% | 16.7% | 20.1% | 5.3% | 4.1% | 617 |
| *Debt/TA* range ≤ 0.200 | 42.9% | 21.5% | 22.6% | 9.3% | 3.8% | 1,015 |
| Panel B. Stable leverage regimes of 10 years or more | | | | | | |
| *Debt/TA* range ≤ 0.050 | 88.8% | 3.6% | 3.3% | 2.1% | 2.1% | 994 |
| *Debt/TA* range ≤ 0.100 | 62.2% | 11.5% | 12.9% | 7.2% | 6.2% | 2,158 |
| *Debt/TA* range ≤ 0.150 | 48.7% | 14.7% | 16.9% | 10.8% | 8.8% | 3,267 |
| *Debt/TA* range ≤ 0.200 | 42.7% | 16.5% | 17.9% | 12.4% | 10.5% | 4,143 |

**Table IA.VII**

**Departures from and Reversions to Stable Leverage Regimes**

A leverage regime is considered stable if the firm’s *Debt/Total Assets* ratio takes values that differ by no more than 0.100 for 10 or more consecutive years. For each firm that has a stable leverage regime in this sense, the table considers only its longest such regime. The table also restricts attention to firms that have been listed on Compustat for at least 20 years and that have 10 years of nonmissing data after the end of its stable leverage regime. There are 575 firms that meet these sampling conditions. We find qualitatively identical results when we examine (i) the sample of firms with complete data through three years after the end of their stable leverage regimes and (ii) our constant-composition sample. For a given firm, the last year of its stable regime is designated event year *t* = -1 so that *t* = 0 is the year of its departure from stability, and all other event years are relative to *t* = 0. Row 1 documents the percent of firms whose *Debt/TA* ratios beginning at *t* = 0 remain within a range of values that does not exceed 0.100, that is, that enter a new stable leverage regime (per the same stability criterion described above). Row 3 reports the percent of firms with *Debt/TA* ratios that fall within the bounds of the earlier stable regime, that is, this row documents the extent to which leverage reverts back to the zone it consistently inhabited for at least 10 years prior to *t* = 0. The frequencies with which leverage remains outside that earlier stable zone are reported in rows 2, 4, 5, and 6. Row 7 (row 9) reports the frequency that a firm’s dollar value of debt outstanding in the event year in question exceeds (falls below) its value in year *t* = -1. Row 8 (row 10) reports the frequency that this debt amount does not exceed (does not fall below) its *t* = -1 value.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | % of firms in specified year  (relative to year 0 departure from stable leverage regime): | | | | | | | |
|  | -1 | 0 | 1 | 2 | 3 | 4 | 5 | 10 |
| Establishment of a new stable leverage regime: |  |  |  |  |  |  |  |  |
| 1. Firms with range of *Debt/TA*≤ 0.100 beginning at *t* = 0 | --- | 100.0% | 87.3% | 73.6% | 58.7% | 46.9% | 37.3% | 5.6% |
|  |  |  |  |  |  |  |  |  |
| *Debt/TA* relative to leverage during regime that ended at *t* = -1: |  |  |  |  |  |  |  |  |
| 2. *Debt/TA* above high end of earlier stable leverage regime | 0.0% | 70.9% | 61.3% | 60.7% | 60.1% | 60.1% | 61.3% | 60.0% |
| 3. *Debt/TA* within earlier stable leverage regime | 100.0% | 0.0% | 15.9% | 17.4% | 20.7% | 20.0% | 20.6% | 23.1% |
| 4 *Debt/TA* below low end of earlier stable leverage regime | 0.0% | 29.1% | 22.8% | 21.9% | 19.2% | 19.9% | 18.1% | 17.0% |
|  |  |  |  |  |  |  |  |  |
| 5*. Debt/TA* more than 0.05 above high end of earlier regime | 0.0% | 41.8% | 45.1% | 46.1% | 46.3% | 44.6% | 43.6% | 47.0% |
| 6. *Debt/TA*more than 0.05 below low end of earlier regime | 0.0% | 5.6% | 9.4% | 10.6% | 11.8% | 11.5% | 12.0% | 11.9% |
|  |  |  |  |  |  |  |  |  |
| *Debt/TA* above high end of stable regime that ended at *t* = -1: |  |  |  |  |  |  |  |  |
| 7. Increased borrowing | --- | 99.0% | 99.1% | 99.1% | 99.1% | 98.6% | 99.1% | 98.0% |
| 8. No increase in borrowing | --- | 1.0% | 0.9% | 0.9% | 0.9% | 1.4% | 0.9% | 2.0% |
|  |  |  |  |  |  |  |  |  |
| *Debt/TA* below low end of stable regime that ended at *t* = -1: |  |  |  |  |  |  |  |  |
| 9. Debt paydown | --- | 86.2% | 80.9% | 65.9% | 70.0% | 54.4% | 47.1% | 43.3% |
| 10. No debt paydown | --- | 13.8% | 19.1% | 34.1% | 30.0% | 45.6% | 52.9% | 56.7% |
|  |  |  |  |  |  |  |  |  |

**Table IA.VIII**

**Target Leverage Variation and Leverage Peaks**

The table presents the median values of *Debt/Total Assets*, four estimates of target leverage ratios, and various financial variables surrounding leverage peaks (the highest ever *Debt/TA* ratio) for 1,699 firms listed 20 or more years on Compustat. Event year *t* = 0 is the calendar year of peak leverage while *t* = 1 is the year immediately after the peak. All other event years over *t* = -3 to *t* = 3 are defined analogously. When a firm has multiple periods with the same peak leverage, we use the first such period here. With *Target model 1*, the target leverage ratio of a firm is estimated as the fitted value from a regression (using the full sample) of *Debt/TA* on the four Rajan and Zingales (1995) variables specified in rows 9 to 12. For*Target models 2, 3*, and *4*,wegenerate target ratio estimates in similar fashion. The only difference is that now industry-median leverage (at respectively the four-digit, three-digit, or two-digit SIC level) is included as an explanatory variable along with the determinants used in the first model. The firm under analysis is excluded from the calculation generating industry-median leverage. If there are no other firms in the same four-digit (three-digit) industry, we use the three-digit (two-digit) industry-median leverage ratio instead. *Asset growth* equals assets in event year *t* minus assets in year *t-*1, all divided by assets in *t-*1. The same divisor is applied to year *tCapital expenditures, Financing deficit, Change in debt*, and *EBITDA*. For *Tangible assets* in year *t*, we divide by total assets in year *t*. The financing deficit measures the amount of external financing net of distributions in a given year and equals the sum of net equity issues and net debt issues. (A negative financing deficit (i.e., a financing surplus) indicates that, on net, the firm does not raise outside funds in the period under consideration.)We employ the change in total debt outstanding as the measure of net debt issues to avoid sample-size shrinkage because of missing values on Compustat of the latter variable. For inclusion in this table, firms must be listed on Compustat through year *t* = 3. The variables in rows 9 to 16 are Winsorized at the 1% level. In the column for *t* = 0, we use\*\*\*, \*\*, and \* to identify, respectively, significant differences at the 0.00, 0.01, and 0.10 levels or better for Wilcoxon tests that compare the *t* = 0 median value of a variable and its *t* = -1 value. In the column for *t* = 1, we use the same symbols to identify significant differences between the *t* = 1 and *t* = 0 values of each variable.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Event year relative to leverage peak in year 0: | | | | | | |
| Median value of | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 1. *Debt/Total Assets* | 0.256 | 0.287 | 0.337 | 0.446\*\*\* | 0.362\*\*\* | 0.314 | 0.282 |
| 2. *Target model 1* | 0.246 | 0.245 | 0.248 | 0.251\* | 0.252 | 0.251 | 0.247 |
| 3. *Target model 2* | 0.252 | 0.250 | 0.252 | 0.258\* | 0.260 | 0.257 | 0.253 |
| 4. *Target model 3* | 0.253 | 0.251 | 0.256 | 0.260\* | 0.261 | 0.257 | 0.253 |
| 5. *Target model 4* | 0.250 | 0.250 | 0.255 | 0.259\* | 0.261 | 0.257 | 0.251 |
|  |  |  |  |  |  |  |  |
| 6. *Ind-median 4-digit* | 0.218 | 0.219 | 0.223 | 0.227 | 0.227 | 0.222 | 0.219 |
| 7. *Ind-median 3 digit* | 0.216 | 0.219 | 0.224 | 0.229 | 0.224 | 0.219 | 0.216 |
| 8. *Ind-median 2 digit* | 0.214 | 0.216 | 0.219 | 0.222 | 0.219 | 0.217 | 0.219 |
|  |  |  |  |  |  |  |  |
| 9. *EBITDA* | 0.155 | 0.152 | 0.137 | 0.118\*\*\* | 0.129\*\*\* | 0.143 | 0.149 |
| 10. Log (Sales) | 4.606 | 4.708 | 4.806 | 4.876 | 4.969 | 5.040 | 5.122 |
| 11. *Market-to-book* | 1.260 | 1.223 | 1.171 | 1.166 | 1.160 | 1.172 | 1.160 |
| 12. *Tangible assets* | 0.292 | 0.297 | 0.299 | 0.293 | 0.290 | 0.282 | 0.281 |
|  |  |  |  |  |  |  |  |
| 13. *Asset growth* | 0.099 | 0.098 | 0.102 | 0.101 | 0.010\*\*\* | 0.039 | 0.055 |
| 14. *Capital expenditures* | 0.063 | 0.064 | 0.062 | 0.055\*\*\* | 0.039\*\*\* | 0.043 | 0.049 |
| 15. *Financing deficit* | 0.022 | 0.027 | 0.044 | 0.094\*\*\* | -0.044\*\*\* | -0.018 | -0.011 |
| 16. *Change in debt* | 0.020 | 0.029 | 0.048 | 0.108\*\*\* | -0.052\*\*\* | -0.021 | -0.012 |

**Table IA.IX**

**Target Leverage Variation and Leverage Troughs**

The table presents the median values of *Debt/Total Assets*, four estimates of target leverage ratios, and various financial variables surrounding leverage troughs (the lowest ever *Debt/TA* ratio) for 1,699 firms listed 20 or more years on Compustat. Event year *t*= 0 is the calendar year of trough leverage while *t* = 1 is the year immediately after the peak. All other event years over *t* = -3 to *t* = 3 are defined analogously. When a firm has multiple periods with the same trough leverage, we use the first such period here. With *Target model 1*, the target leverage ratio of a firm is estimated as the fitted value from a regression (using the full sample) of *Debt/TA* on the four Rajan and Zingales (1995) variables specified in rows 9 to 12. For*Target models 2, 3*, and *4,*we generate target ratio estimates in similar fashion. The only difference is that now industry-median leverage (at respectively the four-digit, three-digit, or two-digit SIC level) is included as an explanatory variable along with the determinants used in the first model. The firm under analysis is excluded from the calculation generating industry-median leverage. If there are no other firms in the same four-digit (three-digit) industry, we use the three-digit (two-digit) industry-median leverage ratio instead. *Asset growth* equals assets in event year *t* minus assets in year *t-*1, all divided by assets in *t-*1. The same divisor is applied to year *t Capital expenditures, Financing deficit, Change in debt*, and *EBITDA*. For tangible assets in year *t*, we divide by total assets in year *t*. The financing deficit measures the amount of external financing net of distributions in a given year and equals the sum of net equity issues and net debt issues. (A negative financing deficit (i.e., a financing surplus) indicates that, on net, the firm does not raise outside funds in the period under consideration.)We employ the change in total debt outstanding as the measure of net debt issues to avoid sample-size shrinkage because of missing values on Compustat of the latter variable. For inclusion in this table, firms must be listed on Compustat through year *t* = 3. The variables in rows 9 to 16 are Winsorized at the 1% level. In the *t* = 1 column, we use we use\*\*\*, \*\*, and \*, respectively,to identify significant differences at the 0.00, 0.01, and 0.10or better for Wilcoxon tests that compare the *t* = 1 median value of a variable and its *t* = 0 value.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Event year relative to leverage trough in year 0: | | | | | | |
| Median value of | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| 1. *Debt/Total Assets* | 0.107 | 0.077 | 0.047 | 0.010 | 0.131\*\*\* | 0.169 | 0.186 |
| 2. *Target model 1* | 0.236 | 0.232 | 0.230 | 0.228 | 0.227 | 0.234 | 0.240 |
| 3. *Target model 2* | 0.238 | 0.233 | 0.232 | 0.230 | 0.228 | 0.236 | 0.242 |
| 4. *Target model 3* | 0.237 | 0.233 | 0.230 | 0.230 | 0.231 | 0.237 | 0.246 |
| 5. *Target model 4* | 0.241 | 0.236 | 0.232 | 0.231 | 0.230 | 0.240 | 0.245 |
|  |  |  |  |  |  |  |  |
| 6. *Ind-median 4-digit* | 0.193 | 0.189 | 0.193 | 0.198 | 0.201 | 0.206 | 0.208 |
| 7. *Ind-median 3 digit* | 0.198 | 0.195 | 0.195 | 0.196 | 0.202 | 0.207 | 0.209 |
| 8. *Ind-median 2 digit* | 0.199 | 0.197 | 0.198 | 0.199 | 0.203 | 0.207 | 0.208 |
|  |  |  |  |  |  |  |  |
| 9. *EBITDA* | 0.174 | 0.178 | 0.187 | 0.190 | 0.185 | 0.161 | 0.154 |
| 10. *Log (Sales)* | 4.251 | 4.356 | 4.469 | 4.567 | 4.690\* | 4.818 | 4.921 |
| 11. *Market-to-book* | 1.278 | 1.291 | 1.357 | 1.417 | 1.328\*\* | 1.258 | 1.253 |
| 12. *Tangible assets* | 0.275 | 0.269 | 0.265 | 0.260 | 0.285\*\* | 0.291 | 0.291 |
|  |  |  |  |  |  |  |  |
| 13. *Asset growth* | 0.070 | 0.068 | 0.070 | 0.076 | 0.185\*\*\* | 0.103 | 0.077 |
| 14. *Capital expenditures* | 0.053 | 0.051 | 0.052 | 0.057 | 0.079\*\*\* | 0.068 | 0.059 |
| 15. *Financing deficit* | -0.003 | -0.005 | -0.004 | -0.007 | 0.092\*\*\* | 0.020 | 0.007 |
| 16. *Change in debt* | -0.001 | -0.002 | -0.002 | -0.004 | 0.089\*\*\* | 0.019 | 0.006 |

**Table IA.X**

**Time-Series Variation in Leverageof 24 Major Industrial Firms**

The last column gives a capsule summary of case details reported below. The table lists each firm by its most familiar name, with alternative names provided in parentheses for clarity in some cases. Leverage is measured as the *Debt/Total Assets* ratio.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | Maximum annual: | |  |
|  | *Debt/TA*  range | Min  *Debt/TA* | *Debt/TA* increase | *Debt/TA* decrease | Capsule summary of notable case features |
| General Electric | 0.670 | 0.000 | 0.255 | -0.159 | Fund post-WW II expansion |
| General Motors | 0.634 | 0.000 | 0.213 | -0.345 | Fund post-WW II expansion while paying substantial dividends |
| IBM | 0.396 | 0.022 | 0.080 | -0.093 | Fund post-WWII expansion; mostly passive deleveraging |
| Procter & Gamble | 0.395 | 0.000 | 0.115 | -0.117 | Fund post-WW II expansion; passive deleveraging |
| Allied Chemical (Honeywell) | 0.356 | 0.000 | 0.251 | -0.081 | Fund post-WW II expansion; then passive deleveraging |
| Union Carbide | 0.464 | 0.000 | 0.231 | -0.092 | Fund post-WW II expansion; then passive deleveraging |
| Sears Roebuck | 0.608 | 0.000 | 0.347 | -0.312 | Fund post-WW II expansion of installment-sales business |
| International Harvester (Navistar) | 0.751 | 0.000 | 0.215 | -0.183 | Fund post-WW II extension of credit to customers and dealers |
| Caterpillar | 0.547 | 0.000 | 0.196 | -0.154 | Fund post-WW II plant expansion |
| B.F. Goodrich | 0.442 | 0.000 | 0.292 | -0.108 | Fund expansion in 1960s; then mostly passive deleveraging |
| Goodyear Tire & Rubber | 0.431 | 0.000 | 0.203 | -0.203 | Transitory borrowing to buy back stock and deter a hostile takeover |
| Altria (Philip Morris) | 0.502 | 0.000 | 0.271 | -0.212 | Fund expansion during WWII |
| American Tobacco (Fortune Brands) | 0.480 | 0.003 | 0.199 | -0.157 | Fund diversifying acquisitions in 1960s |
| Eastman Kodak | 0.433 | 0.000 | 0.205 | -0.301 | Fund diversifying acquisitions in 1980s |
| DuPont | 0.317 | 0.000 | 0.138 | -0.094 | Fund 1980s acquisition of Conoco |
| ChevronTexaco (Standard Oil of CA) | 0.375 | 0.000 | 0.292 | -0.134 | Fund 1980s acquisition of Gulf Oil |
| Texaco | 0.320 | 0.000 | 0.207 | -0.094 | Fund 1980s acquisition of Getty Oil |
| Exxon Mobil (Standard Oil of NJ) | 0.197 | 0.000 | 0.078 | -0.045 | Keep debt conservative while funding growth opportunities |
| AT&T | 0.375 | 0.113 | 0.126 | -0.131 | Fund post-WW II expansion with equity to build flexibility |
| U.S. Steel | 0.469 | 0.018 | 0.196 | -0.138 | Presciently timed deleveraging prior to Great Depression |
| Bethlehem Steel | 0.400 | 0.055 | 0.172 | -0.137 | “Follow the leader” deleveraging prior to Great Depression |
| International Paper | 0.532 | 0.000 | 0.203 | -0.186 | Distress-induced deleveraging, then levering up to fund investment |
| Woolworth (Foot Locker) | 0.318 | 0.002 | 0.091 | -0.081 | Proactive deleveraging after levering up amid financial trouble |
| Coca-Cola | 0.323 | 0.000 | 0.116 | -0.094 | CEO with aggressive approach to debt (including for mergers) |
| Median across 24 firms | 0.432 | 0.000 | 0.203 | -0.136 |  |

**Case Studies: Leverage Decisions of 24 Major Industrial Firms**

This section of the appendix contains plots of the leverage ratios from the early part of the 20th century to the present day of 24 major industrial firms, and provides a compact discussion of a selected significant feature of each firm’s leverage history. The cases are listed in the order that they appear in Table IA.X in this appendix, which groups similar cases near each other. The date of the first (and sometimes the last) observation differs across companies, and so one must be careful in scanning across firms to be sure that one is comparing leverage in the same year. Since leverage ranges vary substantially, the scale of the vertical axis also differs across firms.

All 24 firms are members of our constant-composition sample, which means they are included on Compustat from 1950 to 2000. All 24 also (i) were publicly held prior to the Great Depression, (ii) issued annual reports back to at least 1926 with clearly delineated financial debt amounts, and (iii) were included in the Dow Jones Industrial Average (DJIA) at some point. For each firm, we track leverage back to 1900 if possible, but more generally as far back as annual report disclosures clearly separate financial debt from other liabilities (e.g., notes payable versus accounts payable). In cases in which firms had major financial subsidiaries whose debt obligations in some years were not consolidated with the parent, we obtain whatever financial data for the subsidiaries are provided in company disclosures, and report estimated leverage ratios based on our construction of the relevant consolidated balance sheets. The latter firms are AT&T, Caterpillar, General Electric, General Motors, Goodrich, Goodyear, IBM, Kodak, International Harvester (Navistar), Altria (Philip Morris), Sears Roebuck, Texaco, and Union Carbide. Two firms have financial subsidiaries whose operations are too small to merit disclosure (Coca-Cola) or the information that is disclosed is insufficient to estimate the leverage of the consolidated entity (U.S. Steel). For the case analyses, annual reports, Moodys manuals, and financial press articles (mostly from the *New York Times* and the *Wall Street Journal*) are our main source documents, but we also consult the memoirs of some executives and company histories (<http://www.fundinguniverse.com/company-histories/>).

**General Electric’s conservative leverage, transitory debt usage, and conversion to a high leverage capital structure**: GE had virtually no debt outstanding from the mid-1920s through the end of World War II, but *Debt/TA* spiked to 0.255 in 1946, as the firm took out a 20-year $200 million loan from a group of insurance companies (and arranged a $100 million bank credit line) to help fund a substantial expansion of productive capacity to meet the demands of the post-war economy. GE paid off much of this debt by 1950. *Debt/TA* increased sharply to 0.114 in 1951 and then to 0.239 in 1956 as GE borrowed to fund further expansion. *Debt/TA* also increased sharply in the 1960s and 1980s, converting GE into a highly levered firm with *Debt/TA* above 0.600 by the late 1980s – an increase in leverage that reflects GE’s substantially increased emphasis on the provision of financial services.

**General Motors’ post-World War II “levering up” to fund expansion**:GM’s cash balances were reduced substantially by a UAW strike that resulted in closure of most plants in 1945, and in reduced earnings for 1946 that were inadequate to cover the dividend. This cash squeeze led GM to borrow $125 million from eight insurance firms. Thus began a series of large debt increases that helped fund GM’s massive post-war expansion, and that took *Debt/TA* from 0.001 in 1945 to 0.366 in 1956. GM made huge capital outlays over 1950 to 1953 and had plans to accelerate the rate of expenditure, and so, in Alfred P. Sloan’s words, “it was clear that we would have to raise new capital if we were to continue to pay out a substantial part of each year’s earnings in the form of dividends.” GM accordingly sold $300 million in long-term debt in late 1953, and raised $325 million of equity in early 1955 in a rights offering that was the largest-to-date public stock offering by an industrial firm. Rights offering notwithstanding, *Debt/TA* increased in 1955 and again in 1956.

**IBM’s deleveraging during the 1950s and 1960s**: In 1957, two years into Tom Watson Jr.’s tenure as president and a year after the death of his father (IBM’s legendary founder), the firm raised $200 million in a rights offering that was the second largest public stock offering on record. Watson Jr. indicated that IBM sold stock because it had “borrowed as much as you could borrow.” Over the next 15 years, *Debt/TA* declined markedly, reaching 0.099 in 1971 when Watson Jr. retired. This leverage decline was driven largely by asset growth rather than by debt paydown or stock sales. In 1966, with *Debt/TA* near 0.100 and IBM operating with ample debt capacity that could have been tapped for cash, IBM sold equity to meet unanticipated funding needs associated with its all-out campaign to produce the IBM 360 mainframe computer. The funding need was not due to a technological shock, but rather to the fact that IBM’s cash management controls were so poor that management discovered the firm would soon be unable to meet payroll without raising outside capital!

**Procter & Gamble’s “levering up” and deleveraging of the 1950s**: From 1922 through the mid-1950s, P&G was conservatively levered, with 1928 the only year in which leverage exceeded 0.100, and then only slightly so. In explaining P&G’s 1956 bond offering, the firm’s president said, “the increase in our business has accelerated with the rapid advance in this country’s population and economy so the company is no longer able to provide its capital needs and still distribute a reasonable share of corporate earnings to its shareholders.” This bond offering followed an also large note placement in 1952. *Debt/TA* hit a local peak of 0.170 in 1957, and then gradually fell back below 0.100 – not because of debt repayment, but because the firm’s rapid asset growth outpaced its modest debt increase.

**Allied Chemical’s “levering up” to fund post-war expansion**: In 1924, Allied Chemical’s management proudly announced that it had paid off all debt, and the firm remained debt-free until the early 1950s. In 1951, the firm borrowed $50 million from a group of banks, and announced it would potentially increase its total borrowing to $200 million (which it did the next year) to help fund construction expenditures. *Debt/TA* jumped from 0.000 in 1951 to 0.356 in 1953. The deleveraging over the next few years occurred passively, with total debt remaining constant and asset growth resulting in a lower leverage ratio. The firm never again approached the unlevered capital structure it maintained from prior to the Depression through the early 1950s.

**Union Carbide’s “levering up” and passive deleveraging during its post-World War II expansion**: In 1945, Union Carbide paid off its outstanding debt of $23 million and terminated its $50 million credit line, which it had obtained in 1942, but never used. In that year, the firm also doubled its outlays for the construction and acquisition of production facilities to $23 million (from $11 million in 1944), and projected that it would soon make “substantially larger” outlays. Actual capital outlays totaled $49.7 million in 1946 and $104.2 million in 1947, and expenditures on additional production capacity totaled $281 million from the end of the war through 1948. In 1947, *Debt/TA* spiked from 0.000 to 0.231, as Union Carbide borrowed $150 million from three insurance companies to provide “funds required for the expansion program.” The deleveraging over the next several years was passive, as the firm’s debt obligations remained constant and its asset growth continued at a significant rate.

**Sears Roebuck’s “levering up” of the 1950s**: *Debt/TA* jumped from 0.000 to 0.158 in 1951, as Sears took on bank debt “in large measure to finance installment-sales terms to customers.” *Debt/TA* eroded slightly over the next few years through asset growth, a contribution of stock to the pension fund, and a small, temporary debt reduction. This leverage reduction briefly delayed Sears’ transformation into a more highly leveraged entity – a transformation that reflects its evolution from a “cash sales” business to one in which consumer credit extension was an important element of sales. *Debt/TA* increased from 0.070 in 1956 to 0.277 in 1958, reflecting greater borrowing associated with expansion of the installment-loan and revolving credit business (and formation of a captive finance subsidiary).

**International Harvester’s 1950s transition from conservative to substantial leverage**: IH’s *Debt/TA* ratio declined from 0.137 in 1913 to 0.050 in 1920 to 0.000 in 1926 and, over the next two decades, never exceeded 0.003. In 1949, IH formed a captive finance subsidiary to provide supplementary credit for dealers, distributors, and retail customers, with the subsidiary taking on a significant amount of short-term bank debt, which raised the parent’s *Debt/TA* ratio to 0.062. Increased borrowing to support the credit subsidiary’s activities raised *Debt/TA* above 0.200 by 1952, and it remained above that level for the next five decades.

**Caterpillar’s transitory debt issuances and conversion from a conservative to high leverage capital structure**: From 1926 to 1945, Caterpillar went through four periods in which it borrowed a moderate amount and then fully repaid the debt and restored a 0.000 *Debt/TA* ratio. In 1946, sales fell 44% amid a month-long strike at a major plant and a general post-war shortage of inputs, and *Debt/TA* spiked from 0.000 to 0.196, as the firm borrowed $20 million, or four times the largest amount of debt it had outstanding over the prior 20 years. Management indicated that this debenture offering was “made for the purpose of providing part of the funds for the plant expansion now in progress.” In 1948, *Debt/TA* jumped to 0.278 as Caterpillar took on substantial bank debt to “provide more capital for expansion of its plant facilities.” In 1956, *Debt/TA* declined to 0.082, with Caterpillar using the proceeds of a $33.2 million stock offering in part to pay down debt and to enhance the possibility that “outside funds for growth can be satisfactorily obtained from term bank loans.”

**B.F. Goodrich’s 1960s “levering up” to fund expansion, followed by (mostly passive) deleveraging**: From the mid-1940s through the mid-1960s, Goodrich’s leverage remained relatively stable, with *Debt/TA* neither falling below 0.080 nor exceeding 0.175. *Debt/TA* increased from 0.159 in 1965 to 0.192 in 1965 as B.F. Goodrich borrowed to fund the highest capital expenditures in the firm’s history. The company announced a five-year $400 million capital expenditure program for 1966 to 1970, and additional borrowing to fund that program raised *Debt/TA* to 0.403 in 1970. A decade of deleveraging followed with *Debt/TA* declining to 0.230 in 1979. This substantial deleveraging reflects a modest amount of debt repayment, but was largely due to Goodrich’s substantial growth in assets. (Goodyear Tire & Rubber also materially ramped up its borrowing from 1965 to 1970 to fund record high capital expenditures, and then passively deleveraged over the next 10 years as asset growth outstripped additional borrowing. Goodyear T&R’s “levering up” in the 1960s is evident in the graph below, but our case discussion of this firm focuses on its sharp leverage increase in the 1980s.)

**Goodyear’s transitory borrowing to repurchase stock and deter a hostile takeover, followed by deleveraging financed by asset sales**: Goodyear fended off a 1986 hostile takeover attempt by Sir James Goldsmith through a debt-financed repurchase of almost half of its stock (from Goldsmith and public investors), which raised *Debt/TA* from 0.165 in 1985 to 0.431 in 1987. The firm also announced restructuring plans that included sales of its energy and aerospace units, with cash proceeds earmarked for debt reduction. By 1993, repayment of debt reduced the firm’s debt almost back to its 1985 level, with *Debt/TA* at 0.168, or virtually identical to the leverage ratio that had prevailed prior to Goldsmith’s takeover attempt. (In 1985, Goodyear’s close competitor B.F. Goodrich voluntarily announced a major restructuring that included plans for asset sales and debt reduction. The resultant deleveraging is apparent in the leverage graph for B.F. Goodrich in the case study presented immediately above.)

**Altria’s transitory debt issuance to fund acquisitions and 1940s transition from conservative to substantial leverage**: With the brief exception of a small loan in 1926, Altria avoided debt from 1920 to 1933. *Debt/TA* spiked to 0.271 in 1934 as Altria used a bank loan to acquire assets from two other tobacco firms. Altria’s debt was almost fully paid off by 1940, with the bulk of the proceeds for debt reduction coming from a preferred stock sale in the latter year. Funded by both debt and preferred stock sales over the next several years, Altria’s assets grew 131% over 1940 to 1945, with its cigarette products the object of intense demand by the troops during World War II. *Debt/TA* increased from 0.001 in 1940 to 0.422 in 1945 and the firm never again approached a conservatively leveraged capital structure. *Debt/TA* ranged between approximately 0.300 and 0.500 over the 50 years following World War II.

**American Tobacco’s 1950s deleveraging and 1960s debt-financed diversifying acquisitions**: In 1942, American Tobacco borrowed heavily to fund inventory expansion, in the process taking *Debt/TA* to nearly 0.500, after having its leverage ratio remain near 0.000 from the mid-1920s to mid-1930s. Over the 1950s and early 1960s, the firm was in deleveraging mode, with *Debt/TA* reduced to nearly 0.100 through a combination of substantial debt repayments and moderate asset growth. *Debt/TA* increased from 0.123 in 1964 to 0.193 in 1965 primarily due to short-term borrowing to purchase tobacco leaves and retire preferred stock. Over the next five years, American Tobacco took on substantial additional debt to help fund numerous acquisitions, lifting *Debt/TA* to 0.376 in 1970. The early 1960s were a period of considerable bad news about the health consequences of smoking, and the firm’s acquisition program focused almost entirely on diversifying out of tobacco and into alcoholic beverages, biscuits, information storage, office supplies, locks, toiletries, and soaps. The firm was renamed American Brands (later Fortune Brands) in recognition of its new broader business orientation.

**Eastman Kodak’s “levering up” of the 1980s and 1994 deleveraging**: After more than 80 years with little or no debt, Kodak’s *Debt/TA* ratio spiked to over 0.400 in the late-1980s. Kodakin the 1980s faced substantial downward pressure on profitability, which led the firm to abandon its policy of paternalistic employment guarantees for workers, thereby providing financial breathing room for the firm to consider large amounts of debt capital. Increased competition in its traditional area of strength – film and camera production – led Kodak to experiment with debt-financed diversifying acquisitions, most notably to spend $5.1 billion to buy Sterling Drug in 1988. In the early 1990s, layoffs continued and investors began pressuring Kodak, with the board ultimately firing the CEO for not moving aggressively enough to cut costs. The large deleveraging in 1994 was funded by cash raised by the new CEO’s program to divest the vast bulk of assets (including those of Sterling Drug) with no relation to photography and electronic imaging. By year-end 1994, the *Debt/TA* ratio was down to 0.069 after remaining above 0.360 for six years, but this low leverage position lasted only briefly, as Kodak took on new debt in 1998 and 2000.

**Du Pont’s transition from conservative to moderate leverage**: *Debt/TA* remained near 0.000 from the mid-1920s through the mid-1960s and then steadily increased to 0.074 by 1973. In 1974, leverage spiked to 0.186 as Du Pont borrowed to fund substantial capital outlays amid a recession-related earnings decline. In 1981, *Debt/TA* spiked again (now to 0.298) as Du Pont borrowed aggressively to buy Conoco, while announcing plans for asset sales to “restore the financial flexibility needed for pursuit of major investment opportunities.” *Debt/TA* declined to 0.173 by 1988 andthen remained above, and typically well above, 0.150 for the next 20 years.

**ChevronTexaco’s stable conservative capital structure and transitory debt issuance to fund an acquisition**: With one brief exception, Chevron’s *Debt/TA* ratio remained below 0.150 from 1911 to 1983. In 1984, *Debt/TA* spiked from 0.083 to 0.375 as the firm borrowed to buy Gulf Oil. Chevron also announced plans to sell assets and pay down debt to strengthen the firm’s credit rating, which was cut below AAA by the major rating agencies as a result of the debt taken on to buy Gulf.

**Texaco’s stable leverage over four decades and subsequent leverage increase to fund an acquisition**: From the late-1930s to the mid-1980s, *Debt/TA* largely remained within a band of approximately 0.100 and 0.200, reflecting large, but roughly proportionate, growth in assets and debt, with bond offerings often used to raise funds for investment. In 1984, *Debt/TA* increased sharply from 0.112 to 0.320, as Texaco borrowed to buy Getty Oil for about $10 billion and to pay $1.3 billion to repurchase 9.9% of its stock. Over the next two years, Texaco reduced *Debt/TA* by 0.059 by paying off debt with cash from operations and asset sales. (Texaco’s parent-firm leverage actually showed more volatility around this time than is apparent from the diagram due to accounting reclassification of debt (as another type of liability),that was required when a contractual dispute over the Getty merger led Texaco to file for Chapter 11.)

**Exxon’s stable capital structure over the 1940s to 1960s and its late 1960s decision to “lever up”**: In 1957, Exxon raised $281 million in a rights offering that had little impact on its *Debt/TA* ratio, which remained near 0.100 from the early-1940s to 1966. The 1957 stock sale was motivated by a need for cash to fund profitable growth opportunities, and the firm explained the decision to raise equity rather than borrowing as an action that “has kept the company’s debt at a conservative level in relation to total capital….and also has improved its financial flexibility for meeting future needs and opportunities as they arise.” Exxon took on substantial new debt in the late 1960s because its “investment program has doubled in the last three years and has required more funds than have been available from expanding internal cash flows.”

**AT&T’s 1950s equityfinancing program to limit its leverage and build financial flexibility**: With its *Debt/TA* ratio reaching 0.464 in 1949, management expressed concern about the extent of AT&T’s reliance on debt capital and articulated a general plan to reduce leverage: “Most of the new money to meet service demands should come from the issue of stock, either through bond conversion or otherwise. That is the foundation of our entire financing program.” Financial flexibility was at the core of management’s deleveraging strategy: “As a long-range objective, the proportion of debt should be further reduced. Experience makes clear the wisdom of this. When the System entered the postwar period, less than a third of its capital was debt. That made it possible for the Bell Companies to obtain, in a very short time, the enormous amounts of new money needed to meet unprecedented service demands….We should be no less well prepared in the future.”

**U.S. Steel’s presciently timed 1929 deleveraging:** U.S. Steel repaid 72% of its debt – primarily with cash generated from operations but also from a rights offering of common stock – and thereby reduced *Debt/TA* from 0.197 to 0.059 in 1929. This deleveraging was the brainchild of board member Myron Taylor, who was then chairman of the finance committee and soon to be named chairman of the firm. U.S. Steel projected an annual earnings increase of $20.9 million due to the recapitalization, which provided breathing room to help it weather what turned out to be four years of losses during the Depression.

**Bethlehem Steel’s “follow the leader” 1929 deleveraging**: Coming shortly on the heels of the 1929 deleveraging announced by U.S. Steel, which at the time was arguably the most prominent corporation in the world, Bethlehem Steel initiated a major deleveraging right before the start of the Depression. The firm raised $136 million through rights offerings of common stock on June 18 and October 21 of 1929, which were remarkably timed just prior to the Crash on October 29. Debt repayments reduced *Debt/TA* from 0.310 in 1928 to 0.163 in 1930, providing financial breathing room for the very difficult times that Bethlehem Steel faced in the 1930s.

**International Paper’s protracted financial trouble, subsequent deleveraging, and mid-1960s decision to “lever up”**: IP was experiencing financial difficulties as early as 1927. The firm omitted its common stock dividend in late 1930, reported losses in each year over 1931 to 1935, and was in arrears on preferred dividends by 1931 and remained so until 1941. IP started paying down its debt in 1929 and, with some modest reversals along the way, attained a zero-debt capital structure in 1947. Management highlighted its march to a zero-debt capital structure in a large graphic in the firm’s annual report. *Debt/TA* remained at 0.000 through 1965, and in 1966 IP began borrowing to fund large capital outlays, raising leverage sharply to 0.312 by 1970.

**Woolworth’s levering up amid financial trouble, followed by proactive deleveraging**: In 1993, Woolworth reported a $495 million loss and announced plans to close (or convert to alternative retail formats) 970 unprofitable stores. In 1994, the firm cut its dividend and capital expenditures, and the CEO and CFO were replaced amid allegations of accounting improprieties. During the financial troubles of 1993 and 1994, Woolworth increased short-term debt by almost $800 million, raising *Debt/TA* from 0.119 to 0.285. In 1995, with a new permanent CEO in charge, the firm reported another loss, omitted its dividend, and cut its capital expenditures further. In the same year, Woolworth reduced total debt by $475 million (with short-term debt reduced by almost $800 million through debt repayment and replacement with long-term debt). Further debt repayment in 1996 reduced *Debt/TA* to 0.172, but a brief borrowing resurgence raised *Debt/TA* to 0.267 in 1998. Over the next 10 years, Woolworth reduced debt from $767 million to $142 million, lowering *Debt/TA* to 0.049 in 2008.

**Coca-Cola’s “levering up” of the 1980s**: The appointment of Roberto Goizueta as CEO in 1980 marked a sharp shift in Coca-Cola’s financial policies toward more aggressive use of debt, including a willingness to borrow to make acquisitions (e.g., to acquire Columbia Pictures in 1982). The CEO’s letter to shareholders in the 1985 annual report spelled out the firm’s new financial principles: “In the financial arena, The Coca-Cola Company is pursuing a more aggressive policy. We are using greater financial leverage whenever strategic investment opportunities are available. We are reinvesting a larger portion of our earnings by increasing dividends at a lesser rate than earnings per share growth….And, we are continuing to repurchase our common shares when excess cash or debt capacity exceed near-term investment requirements.” In a 1984 interview, the firm’s CFO stated “We can go up to $1 billion without hurting our triple-A rating, and we would not hesitate to do so if something unusual comes along….” and “we will not hesitate to be a double-A company. I want to make that very clear.” The firm did, in fact, lose its triple-A rating because of its more aggressive use of debt.

**REFERENCE**

Rajan, Raghuram, and Luigi Zingales, 1995, What do we know about capital structure? Some evidence from international data, *Journal of Finance* 50, 1421-1460.