

## Whacked on WACC

After we have completed the first step in arriving at an EPV (earnings power value) which is to calculate **distributable earnings** (Think of after-tax owner earnings using true maintenance capex instead of depreciation) for the company. Now we need to determine the appropriate cost of capital to use in the equation of  $EPV = \text{Adjusted earnings} \times 1/R$ , where  $R = \text{WACC}$ .

Professional finance calls for a calculation of the **weighted average cost of capital**, known affectionately as the **WACC**.

There are three steps:

1. Establish the appropriate ratio between debt and equity financing for this firm.
2. Estimate the interest cost that the firm will have to pay on its debt, after taxes, by comparing it with the interest costs paid by similar firms.
3. Estimate the cost of equity. The approved academic method for this take involves using something called the **capital asset pricing model (see link below)**, in which the crucial variable is the **volatility of the share price of the firm** in question relative to the volatility of the stock market as a whole, as represented by the S&P 500 . That measure is called **beta**, and as much as it is beloved by finance professors, **it is viewed with skepticism by the value investors.** (98) Value Investing (Greenwald).

*CSInvesting: Why because price movement is not risk! Risk always has an adjective preceding it like business-risk, management-risk, financial risk, regulatory risk, etc.*

**An alternative approach** is to begin with the definition of the cost of equity capital: **what the firm must pay per dollar per year to induce equity investors voluntarily to provide funds.** This definition makes determining the cost of equity equivalent to determining the cost of any other resource. The wage cost of labor, for example, is what employers must pay to attract that labor voluntarily. There is no need to be esoteric about how to calculate the cost of equity in practice. We could survey other fund raisers to learn what they feel they must pay to attract funds. Venture capitalist in the late 1990s told us that they believed they had to offer at least **18 percent** to attract funding. Venture investments are clearly more risky than those in **WD-40**; it is understandable that potential investors would demand higher returns. Alternatively, we could estimate the total returns—dividend plus projected capital gains—that investors expect to obtain from companies with characteristics similar to WD-40. This method, the details of which we avoid here, produces **a cost of equity of around 10 percent.** Because long-term equity yields are about **12 percent per year**, and because WD has a much more stable earning history than the average equity investment, 10 percent meets the reasonability test.

The riskier (business, financial, etc.) the higher the cost of capital should be, but to say a great deal more with both confidence and precision is presumptuous. Because value investors are attracted to companies that have steady and predictable income streams, it may be enough to use the federal bond rate and add a percentage point or two. We can test that against a back of the envelope calculation of

the WACC. For a company like WD-40 , with stable earnings unaffected by the business cycle, **a capital structure of 50% debt and 50% equity is reasonable.**

If the interest rate it has to pay is 9 percent, the after-tax cost becomes 6 percent. Again, because of the stability of its earnings and its share prices, we estimate that the equity cost will be 10 percent. Averaging the two gives us a **WACC of 8 percent**, which equals a federal bond rate of 6 percent plus 2 percent. **Eight percent for the weighted average cost of capital seems reasonable.**

If we intend to compare the EPV to the market price, we need to make one final adjustment. The EPV assumes that all the capital is equity capital; it ignores both interest paid on debt and interest received on cash. If there is debt, it has to be subtracted from the EPV. If there is cash in excess of operating requirements, it should be **added back**. Only then can we compare the total EPV with the market price of the equity.

Table 6.7 page 99 in Value Investing

Cost of Capital Rates	EPV	Per share	Plus Cash-Debt Adj. of \$14	Per Share
6%	365	\$23.46	379	\$24.36
8%	275	\$17.61	288	\$18.51
10%	219	\$14.07	233	\$14.97
12%	183	\$11.76	197	12.66

For WD-40, this adjustment adds \$14 million, or about \$0.90 per share, to its value. At our preferred rate of 8%, a share would be worth \$18.50.

You can paw through Value-Line and estimate what the WACC is for companies within industries. For cyclical business like semiconductors, the WACC is above 10% while for food processors, the WACC is 5.5%.

However, the market may be overly optimistic due to extremely low interest rates. See summary at the end of this post.

### **Cost of Capital by Sector**

**Data Used:** Value Line database, of 6177 firms

**Date of Analysis:** Data used is as of January 2013

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on which companies are included in each industry

Industry Name	Number of Firms	Beta	Cost of Equity	E/(D+E)	Std Dev in Stock	Cost of Debt	Tax Rate	After-tax Cost of Debt	D/(D+E)	Cost of Capital
Advertising	32	1.68	11.51%	71.00%	97.40%	4.76%	16.02%	4.00%	29.00%	<b>9.33%</b>
Aerospace/Defense	66	0.98	7.45%	78.97%	44.98%	2.76%	20.08%	2.21%	21.03%	<b>6.35%</b>
Air Transport	36	1.03	7.73%	62.86%	64.94%	3.26%	21.35%	2.56%	37.14%	<b>5.81%</b>
Apparel	54	1.36	9.68%	87.89%	74.88%	3.76%	18.57%	3.06%	12.11%	<b>8.87%</b>
Auto Parts	54	1.76	11.94%	80.41%	57.43%	3.26%	18.77%	2.65%	19.59%	<b>10.12%</b>
Automotive	12	1.73	11.79%	49.16%	59.23%	3.26%	16.24%	2.73%	50.84%	<b>7.18%</b>
Bank	416	0.77	6.24%	43.82%	50.34%	3.26%	16.39%	2.73%	56.18%	<b>4.27%</b>
Bank (Midwest)	68	0.89	6.95%	66.73%	36.37%	2.76%	20.99%	2.18%	33.27%	<b>5.36%</b>
Beverage	35	0.95	7.26%	81.78%	47.17%	2.76%	18.82%	2.24%	18.22%	<b>6.34%</b>
Biotechnology	214	1.23	8.89%	86.27%	79.99%	3.76%	2.98%	3.65%	13.73%	<b>8.17%</b>
Building Materials	43	1.57	10.87%	60.52%	79.76%	3.76%	9.48%	3.40%	39.48%	<b>7.92%</b>
Cable TV	20	1.40	9.90%	60.20%	40.45%	2.76%	21.23%	2.17%	39.80%	<b>6.82%</b>
Chemical (Basic)	18	1.37	9.73%	80.17%	39.24%	2.76%	21.89%	2.16%	19.83%	<b>8.22%</b>
Chemical (Diversified)	33	1.55	10.75%	85.70%	49.02%	2.76%	19.75%	2.21%	14.30%	<b>9.53%</b>
Chemical (Specialty)	70	1.18	8.59%	82.97%	62.90%	3.26%	15.35%	2.76%	17.03%	<b>7.59%</b>
Coal	20	1.47	10.28%	59.39%	56.54%	3.26%	11.27%	2.89%	40.61%	<b>7.28%</b>
Computer Software	191	0.98	7.42%	93.85%	68.39%	3.76%	12.43%	3.29%	6.15%	<b>7.16%</b>
Computers/Peripherals	81	1.37	9.68%	91.16%	81.83%	4.26%	10.01%	3.83%	8.84%	<b>9.16%</b>
Diversified Co.	113	1.22	8.82%	55.96%	60.46%	3.26%	17.18%	2.70%	44.04%	<b>6.13%</b>
Drug	223	1.08	8.00%	87.11%	80.68%	4.26%	5.14%	4.04%	12.89%	<b>7.49%</b>
E-Commerce	64	1.05	7.86%	93.69%	80.60%	4.26%	10.52%	3.81%	6.31%	<b>7.61%</b>
Educational Services	33	0.91	7.01%	80.17%	83.08%	4.26%	21.72%	3.33%	19.83%	<b>6.28%</b>
Electric Util. (Central)	20	0.57	5.08%	54.05%	17.29%	2.26%	30.12%	1.58%	45.95%	<b>3.47%</b>
Electric Utility (East)	17	0.43	4.24%	59.56%	13.21%	2.26%	33.49%	1.50%	40.44%	<b>3.13%</b>
Electric Utility (West)	15	0.58	5.14%	55.13%	14.19%	2.26%	29.09%	1.60%	44.87%	<b>3.55%</b>
Electrical Equipment	64	1.43	10.03%	89.06%	67.79%	3.76%	16.15%	3.15%	10.94%	<b>9.28%</b>
Electronics	123	1.22	8.81%	81.66%	74.24%	3.76%	11.31%	3.33%	18.34%	<b>7.81%</b>
Engineering & Const	30	1.28	9.19%	88.32%	46.03%	2.76%	25.00%	2.07%	11.68%	<b>8.36%</b>
Entertainment	76	1.60	11.05%	74.70%	70.99%	3.76%	12.56%	3.29%	25.30%	<b>9.09%</b>
Entertainment Tech	42	1.11	8.20%	89.65%	53.25%	3.26%	11.01%	2.90%	10.35%	<b>7.66%</b>
Environmental	84	0.66	5.62%	69.89%	79.24%	3.76%	7.60%	3.47%	30.11%	<b>4.97%</b>
Financial Svcs. (Div.)	256	1.34	9.53%	32.85%	55.15%	3.26%	16.23%	2.73%	67.15%	<b>4.96%</b>
Food Processing	119	0.87	6.83%	80.97%	52.26%	3.26%	21.63%	2.55%	19.03%	<b>6.02%</b>
Foreign Electronics	10	1.10	8.13%	68.63%	31.24%	2.76%	23.12%	2.12%	31.37%	<b>6.24%</b>
Funeral Services	6	1.12	8.26%	66.90%	26.75%	2.76%	28.66%	1.97%	33.10%	<b>6.17%</b>

Furn/Home Furnishings	32	1.63	11.20%	81.93%	55.60%	3.26%	16.69%	2.72%	18.07%	<b>9.67%</b>
Healthcare Information	20	0.97	7.36%	89.59%	44.41%	2.76%	20.31%	2.20%	10.41%	<b>6.82%</b>
Heavy Truck & Equip	23	1.80	12.22%	67.89%	55.26%	3.26%	22.74%	2.52%	32.11%	<b>9.10%</b>
Homebuilding	22	1.55	10.73%	66.86%	66.75%	3.76%	7.12%	3.49%	33.14%	<b>8.33%</b>
Hotel/Gaming	57	1.65	11.33%	69.09%	55.66%	3.26%	17.52%	2.69%	30.91%	<b>8.66%</b>
Household Products	27	0.98	7.42%	84.67%	50.86%	3.26%	24.66%	2.46%	15.33%	<b>6.66%</b>
Human Resources	25	1.38	9.76%	90.25%	51.64%	3.26%	26.61%	2.39%	9.75%	<b>9.04%</b>
Industrial Services	136	0.97	7.38%	73.23%	57.24%	3.26%	20.19%	2.60%	26.77%	<b>6.10%</b>
Information Services	28	1.25	9.00%	77.85%	48.75%	2.76%	18.33%	2.25%	22.15%	<b>7.50%</b>
Insurance (Life)	32	1.44	10.11%	64.16%	42.20%	2.76%	21.09%	2.18%	35.84%	<b>7.27%</b>
Insurance (Prop/Cas.)	62	0.85	6.69%	82.32%	28.57%	2.76%	10.73%	2.46%	17.68%	<b>5.95%</b>
Internet	194	1.17	8.56%	97.76%	97.81%	4.76%	8.43%	4.36%	2.24%	<b>8.47%</b>
Investment Companies	31	1.27	9.11%	92.98%	24.10%	2.26%	2.26%	2.21%	7.02%	<b>8.63%</b>
IT Services	63	1.05	7.83%	94.59%	56.11%	3.26%	16.27%	2.73%	5.41%	<b>7.55%</b>
Machinery	94	1.26	9.07%	85.19%	45.07%	2.76%	22.73%	2.13%	14.81%	<b>8.05%</b>
Maritime	51	1.51	10.53%	35.56%	62.52%	3.26%	7.92%	3.00%	64.44%	<b>5.68%</b>
Med Supp Invasive	87	0.87	6.78%	85.85%	55.49%	3.26%	12.60%	2.85%	14.15%	<b>6.23%</b>
Med Supp Non-Invasive	143	1.07	7.94%	88.58%	67.73%	3.76%	10.61%	3.36%	11.42%	<b>7.42%</b>
Medical Services	118	0.84	6.62%	66.56%	74.16%	3.76%	17.72%	3.09%	33.44%	<b>5.44%</b>
Metal Fabricating	25	1.63	11.19%	80.91%	60.59%	3.26%	23.30%	2.50%	19.09%	<b>9.53%</b>
Metals & Mining (Div.)	77	1.62	11.14%	86.64%	93.05%	4.76%	11.24%	4.23%	13.36%	<b>10.22%</b>
Natural Gas (Div.)	31	1.28	9.16%	70.88%	44.57%	2.76%	22.02%	2.15%	29.12%	<b>7.12%</b>
Natural Gas Utility	27	0.46	4.40%	60.18%	28.44%	2.76%	28.80%	1.97%	39.82%	<b>3.43%</b>
Newspaper	14	1.86	12.56%	71.79%	54.39%	3.26%	18.35%	2.66%	28.21%	<b>9.77%</b>
Office Equip/Supplies	22	1.43	10.03%	58.09%	51.92%	3.26%	22.66%	2.52%	41.91%	<b>6.88%</b>
Oil/Gas Distribution	12	1.02	7.65%	65.19%	35.63%	2.76%	18.11%	2.26%	34.81%	<b>5.77%</b>
Oilfield Svcs/Equip.	81	1.66	11.39%	78.30%	59.58%	3.26%	18.20%	2.67%	21.70%	<b>9.50%</b>
Packaging & Container	27	1.20	8.72%	64.03%	36.52%	2.76%	23.09%	2.12%	35.97%	<b>6.35%</b>
Paper/Forest Products	32	1.37	9.73%	69.93%	52.28%	3.26%	11.43%	2.89%	30.07%	<b>7.67%</b>
Petroleum (Integrated)	26	1.17	8.55%	83.01%	47.25%	2.76%	30.34%	1.92%	16.99%	<b>7.42%</b>
Petroleum (Producing)	176	1.45	10.18%	78.05%	71.26%	3.76%	11.71%	3.32%	21.95%	<b>8.68%</b>
Pharmacy Services	18	1.17	8.53%	84.12%	42.23%	2.76%	23.18%	2.12%	15.88%	<b>7.51%</b>
Pipeline MLPs	53	0.74	6.05%	69.27%	24.88%	2.26%	4.30%	2.16%	30.73%	<b>4.86%</b>
Power	101	1.35	9.61%	37.96%	84.63%	4.26%	6.19%	4.00%	62.04%	<b>6.13%</b>
Precious Metals	83	1.03	7.75%	87.99%	77.77%	3.76%	11.13%	3.34%	12.01%	<b>7.22%</b>
Precision Instrument	82	1.27	9.12%	82.50%	60.11%	3.26%	14.13%	2.80%	17.50%	<b>8.01%</b>
Property Management	31	1.30	9.30%	47.04%	50.63%	3.26%	16.50%	2.72%	52.96%	<b>5.82%</b>
Public/Private Equity	12	2.02	13.48%	77.68%	42.00%	2.76%	19.17%	2.23%	22.32%	<b>10.97%</b>
Publishing	29	1.17	8.56%	73.45%	65.72%	3.76%	22.69%	2.91%	26.55%	<b>7.06%</b>
R.E.I.T.	127	1.43	10.04%	72.99%	34.76%	2.76%	0.04%	2.76%	27.01%	<b>8.07%</b>
Railroad	12	1.32	9.40%	81.00%	35.73%	2.76%	28.60%	1.97%	19.00%	<b>7.99%</b>

Recreation	51	1.45	10.14%	72.59%	52.30%	3.26%	20.31%	2.60%	27.41%	<b>8.08%</b>
Reinsurance	11	0.82	6.49%	84.10%	20.74%	2.26%	3.58%	2.18%	15.90%	<b>5.80%</b>
Restaurant	65	1.16	8.48%	88.38%	50.92%	3.26%	19.23%	2.63%	11.62%	<b>7.80%</b>
Retail (Hardlines)	79	1.79	12.14%	79.36%	63.49%	3.26%	22.55%	2.52%	20.64%	<b>10.15%</b>
Retail (Softlines)	42	1.43	10.05%	94.71%	42.54%	2.76%	25.57%	2.05%	5.29%	<b>9.63%</b>
Retail Automotive	19	1.39	9.82%	69.29%	64.20%	3.26%	32.69%	2.19%	30.71%	<b>7.48%</b>
Retail Building Supply	10	1.11	8.22%	89.51%	31.82%	2.76%	25.56%	2.05%	10.49%	<b>7.57%</b>
Retail Store	38	1.29	9.26%	79.63%	63.15%	3.26%	24.83%	2.45%	20.37%	<b>7.87%</b>
Retail/Wholesale Food	30	0.68	5.69%	74.16%	29.93%	2.76%	31.18%	1.90%	25.84%	<b>4.71%</b>
Securities Brokerage	27	1.07	7.95%	27.43%	40.56%	2.76%	30.41%	1.92%	72.57%	<b>3.57%</b>
Semiconductor	142	1.49	10.41%	90.86%	53.65%	3.26%	11.71%	2.88%	9.14%	<b>9.72%</b>
Semiconductor Equip	10	1.79	12.16%	85.48%	40.44%	2.76%	15.21%	2.34%	14.52%	<b>10.73%</b>
Shoe	17	1.26	9.09%	98.10%	47.32%	2.76%	19.89%	2.21%	1.90%	<b>8.96%</b>
Steel	33	1.65	11.32%	64.02%	45.66%	2.76%	24.24%	2.09%	35.98%	<b>8.00%</b>
Telecom. Equipment	105	1.07	7.96%	88.25%	64.86%	3.26%	14.01%	2.80%	11.75%	<b>7.35%</b>
Telecom. Services	76	1.15	8.43%	75.86%	64.04%	3.26%	16.22%	2.73%	24.14%	<b>7.05%</b>
Telecom. Utility	23	0.92	7.08%	48.02%	43.85%	2.76%	26.94%	2.02%	51.98%	<b>4.45%</b>
Thrift	170	0.68	5.68%	83.68%	41.73%	2.76%	15.84%	2.32%	16.32%	<b>5.13%</b>
Tobacco	11	0.86	6.75%	84.13%	36.44%	2.76%	32.82%	1.85%	15.87%	<b>5.97%</b>
Toiletries/Cosmetics	14	1.17	8.52%	82.90%	40.10%	2.76%	27.33%	2.01%	17.10%	<b>7.41%</b>
Trucking	34	1.09	8.08%	70.26%	48.32%	2.76%	25.94%	2.04%	29.74%	<b>6.28%</b>
Water Utility	11	0.49	4.61%	57.74%	37.24%	2.76%	31.45%	1.89%	42.26%	<b>3.46%</b>
Wireless Networking	58	1.35	9.62%	79.57%	62.91%	3.26%	10.06%	2.93%	20.43%	<b>8.25%</b>
<b>Total Market</b>	<b>6177</b>	<b>1.17</b>	<b>8.53%</b>	<b>69.97%</b>	<b>59.15%</b>	<b>3.26%</b>	<b>14.93%</b>	<b>2.77%</b>	<b>30.03%</b>	<b>6.80%</b>

## Summary

I do not like the traditional financial approach that uses Beta or CAPM. Beta is misleading, See \_\_\_\_\_ and \_\_\_\_\_.

I prefer the Greenwald approach because it forces you to think about the business and financial risk of the **particular company**. Also, the CAPM that uses the lower cost of debt financing would lead you to a lower WACC if you had 99.9999% debt financing and .0001 equity financing. Obviously the financial risk would rise dramatically.

Glenn Greenberg of Brave Warrior Capital uses a 15% rate of return. If he can buy at a price which he feels will return 15% per year compounded, then he will buy. So let's say the market reprices upward the business where the stock price infers an 8% return in the future because the stock price rose due to positive expectations, and then he might sell and redeploy his capital. The point is not to double discount. If you can buy a business at a price that implies **your required return of 15** (in Glenn Greenberg's case) then you would not try to wait for a 50% discount on top of that.

Joel Greenblatt in his special situation class in discussing American Express described WACC in terms of valuation this way: If I can buy Amex here at \$45 I think it will be worth \$60 in two years because pension funds will need to buy it to meet their 9% hurdle. I am paraphrasing and I may be misquoting, but that is one way he approached valuation. I guess that is where the art form comes in. How would he know pension funds would use 9%? Experience?

I always stress fundamentals. Try to sit down with a Value-Line and go back over companies' 12 year history and see what the implied WACCs were on the businesses over time. After going through 2,000 companies month after month, you will have a good feel for when to use 8% vs. 12%. But wait for the obvious fat pitch. If the investment is too close to call at 9% or 10% then pass.