**15.402 Midterm Solution**
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**1)** Apex has been maintaining a very low leverage. Its D/E ratio is below 1% if we consider LT and ST debt only, and about –35% if we subtract cash from debt.
Two factors may have contributed to this capital structure.

- First, Apex's sustainable growth rate of about 13.5% exceeds its actual growth rate of about 12%. Thus, retained earnings more than cover their investment and Apex has never had to resort to outside debt financing. The sustainable growth rate itself is explained by high margins (about 15%) and asset turnover, offsetting the mechanical effect of low leverage.
- Second, management has probably not been trying to voluntarily increase Apex's leverage: Their conservative financial policy is certainly deliberate.

**2)** Apex has a high net income, is paying taxes and thus could benefit from tax shields. Moreover, Apex's expected costs of distress seem too low to justify its current capital structure. Indeed:

- Cash-flow volatility: Low, due to safe business strategy.
- Need for external funds: Low since Apex does no R&D and grows slower than its sustainable growth rate;
- Competitive threat if pinched for cash: yes.
- Customers care about distress: not much.
- Assets hard to redeploy: Not really. Patents, brands, stores can be sold.

To increase its leverage, Apex can raise debt to buy back shares or to increase cash dividend. Share repurchases have several advantages:

- They are tax efficient relative to cash dividends.
- Investors see share repurchases as one-time events but expect cash dividends to be maintained. So if we increase dividends now and decrease them when the capital structure reaches the desired level, the market may react negatively.

**3)** I assume that Apex maintains a constant level of Cash. I ignore the interest payment on existing debt and on (part of) Cash (that data is not available).

- Net income (NI) = Margin * Sales(92)*(1+g) = (7%)*3798*(1+11%) = 295
- Retained earning (RE)= (1-d) * NI = (1-.6)*295 = 118
- Net worth(NW) = NW(1992)+RE = 1473+118 = 1591
- Total assets (TA) = Cash + (TA - Cash)*(1+g) = 593 + (2370-593)*1.11 = 2566
- A/P = A/P * (1+g) = 884*1.11 = 981
- Debt(D) plug = TA – A/P - NW = 2566 – 981 - 1591 = -6
- External funding needs = D(93)-D(92) = -6-14 = -20

No external funding is needed. Actually, Apex has excess internal funds of 20.

**4)** Apex's distress costs are much higher, and it should have little debt:

- Cashflow volatility: high, due to the more risky business environment.
- Need for external funding: Apex will incur high CAPX to doing or acquiring R&D. Its current cash is likely to be insufficient.

Indeed, even with its current cost structure, Apex is now growing faster (11%) than its sustainable growth rate (8%).

- Competitive threat if pinched for cash: yes.
- Customers care about distress: Still not much.
- Assets hard to redeploy: Not really, although more than before (more R&D).

Impediments to maintaining low leverage: As argued above, Apex's retained earnings will not suffice. It will have to cut dividends and/or raise equity. Both are negative signals about the firm, leading to a stock price drop.

Remarks about question 1:

Leverage ratios:

- There are several possible measures of a company's leverage ratio. They generally give similar indications on levels, trends, etc.
- Usually, when calculating debt levels, one does not take into include A/P under debt (although it is ST debt in nature) for several reasons:
  - First, after netting against A/R, it is usually not very significant.
  - Also, when calculating the debt level in order to estimate a tax shield, A/P should not be included because they are non-interest bearing and thus provide no tax shield.

Explaining Apex's current capital structure:

- Typical mistakes include not noticing the question, explaining low leverage ratio by "the company has little debt" and the like.
- High margins are not sufficient to explain low leverage. High relative to what? It is precisely to answer this question that we introduced the concept of sustainable growth: A firm will not need to resort to outside finance (and hence will not need to raise debt) when its actual growth rate is below its sustainable growth rate.
  - A very fast growing firm could have both high margins and high leverage.
  - Moreover, margins are only one factor of the sustainable growth rate. For instance, a firm with high margins and very low asset turnover could have a low sustainable growth rate.
- Finally, growing slower than one's sustainable growth rate leads to lower leverage only if management does not actively try to increase leverage, be it because they are unable to do so, (rightly or wrongly) unwilling to do so, or just ignore the issue.

Remarks about question 2:

- When arguing about an optimal capital structure:
  - Start by checking that the firm can use the tax shield of debt (that's usually quick);
  - Please go through all items of the checklist (since it is a checklist)
- How to go through the checklist and conclude:
  - Go through all items of the checklist. Don't write a novel.
  - You are not expected to provide a "correct" evaluation of each item on the list. You have only limited (though carefully chosen) information about the firm and its industry. For instance, there was no penalty for arguing that Apex has volatile cash-flows.

- You are, however, expected to reach conclusions in line with your evaluations. For instance, arguing that high leverage is warranted because of high cash-flows volatility was penalized.
- You are not expected to propose a precise optimal capital structure (like 21.7% leverage) but to give to an idea of the range that is consistent with your evaluation.

- Some students suggested that a gain of raising debt is to pay down A/P.
  - It may be good to replace A/P with debt if debt is cheaper, i.e., if you are actually incurring an implicit interest rate on A/P (by paying late) that exceeds what your bank would charge you instead (as in the Wilson Lumber case).
  - Even when the implicit interest rate actually incurred on late A/P does not exceed that on debt, substituting debt for A/P may increase your tax shield. Indeed, the penalty on A/P is an <u>implicit</u> interest payment, i.e., not counted as interest in your income statement, hence not tax deductible.
  - Note however that both arguments hold only if you are <u>actually</u> incurring the implicit interest rate on A/P. In the case of Apex, we have no information about this. However, given that they have plenty of cash, it is unlikely that they are paying late, thereby incurring a high implicit interest rate. Note also that the first point is not really an argument in favor of increasing leverage. Rather, it is an argument for decreasing A/P: Using cash to repay A/P in time is just as good as raising debt.

<u>Remarks about question 3</u>:

- There is no unique way of forecasting financing needs. Moreover, your forecast will depend on the assumptions you make. So, here again, the emphasis is to be put on:
  - <u>Clarity</u>: Be totally explicit about the assumptions you make (e.g. write "I assume that Total assets grow with Sales"). Many students handed in a page with numbers all over with various arrows and stuff over-written.
  - <u>Consistency</u>: Find the correct result given your assumptions
- Most students chose to make the assumption that Total Assets grow with Sales. This is reasonable in some situations (e.g. maybe in the Wilson Lumber case), the idea being that assets (including some cash) are necessary to generate the sales. However, it is unlikely that all of Apex's cash is necessary for generating sales, i.e., a substantial fraction of Apex's cash is excess cash. It is even less likely that they need to increase cash. So assuming a constant level of cash is already very conservative.
- Note that whatever your assumption about Cash, "Cash" minus "External funding need" should be somewhat close to what we suggest, i.e., 593–(-20) = 613. Indeed, a $1 increase of Cash mechanically translates into a $1 increase in funding need. For instance, if you chose to grow Cash with Sales at 11%, you effectively get an additional funding need of 593*.11 = 65, hence an overall funding need of –20+65=45.
- Again, you were not graded on the assumptions you made, but on whether your forecast was consistent with them (when we were able to decipher them!).