

# FIN 303 Hybrid - Professor Dow

## Financial Forecasting

In this presentation I will introduce some basic elements of financial forecasting and how they connect with the financial plan.

## What are you forecasting?

- Enough cash on hand
- How much money to raise
- Future earnings

The *pro forma* financial statements in the financial plan will include forecasts for a number of items. The cash budget will have forecasts of cash flows to show that cash balances won't go negative. The financial plan will indicate if there will be a need to raise money in the future and how it would be raised. Finally, there will be forecasts of future earnings to show whether asset purchases can be funded internally or whether any money borrowed can be repaid.

Forecasting is a complicated subject and each company's circumstances will be unique. In this presentation we will focus on some basic techniques and principles used in forecasting with a particular emphasis on financing asset purchases.

## Bay Cities Granola

- Sales (revenue) growing over time
- Will need to increase amount of assets
- Will need to finance those assets

We will start with an example of a small company (Bay Cities Granola – a manufacturer of gourmet granola) that expects its business to grow over the next few years. We can think about the forecasting process proceeding in several steps. First, we will forecast how fast sales can grow over time. This will be done in the business/marketing part of the business plan. Next, we will need to determine how much additional assets we will need to support this growth. Finally, we will look at how those assets will be financed.

## Percent of sales

- Assume that sales increase by some percent
- Assume that everything increases at same rate
  - Costs
  - Assets
  - Liabilities

The simplest approach to financial forecasting is the “percent of sales” approach. There are a variety of problems with this approach, which we will discuss later, but it provides a simple starting point for understanding financial forecasting. The first step is to make an assumption that sales will grow at certain rate. Ideally this is based on a detailed market analysis including consumer demand and competitor behavior.

Everything else on the income statement and the balance sheet are assumed to grow at the same rate as sales. Since costs will increase at the same rate as revenue the profit margin will remain the same. It’s assumed that the firm will need more assets to support the increased sales and the amount of assets will increase proportionately and evenly over the years. Finally, it is assumed that the capital structure will remain the same so that liabilities and equity will increase at the same rate as assets.

This assumption generally works best for large, established businesses but it also provides a place to start for small businesses.

## Simple income statement and balance sheet

Revenue increases by 20%

|             | 2015    | 2016 (forecast) |
|-------------|---------|-----------------|
| Revenue     | 100,000 | 120,000         |
| Expenses    | 80,000  | 96,000          |
| Earnings    | 20,000  | 24,000          |
|             |         |                 |
| Assets      | 150,000 | 180,000         |
| Liabilities | 50,000  | 60,000          |
| Equity      | 100,000 | 120,000         |

Here's a simple example of using the percent-of-sales approach to forecast financial variables one year out (2016) based on the current year (2015). Revenue is assumed to grow by 20% and everything else grows at the same rate. Since assets, liabilities and equity all grow at the same rate this leaves the capital structure (the share of assets financed by debt and equity) the same. At this point, the forecast does not specify where the company will borrow the additional money or how it will increase its equity.

## Part of the financial plan

- Investment plan
  - Increase assets by \$30,000
  
- Financing plan
  - Borrow \$10,000
  - Increase equity by \$20,000

In a prior presentation we saw that a business plan includes an investment plan that shows how much and what kind of assets the company needs to acquire and then a financing plan which sets out *how* those assets are paid for, that is, how will the company raise the money to purchase the assets needed to expand its sales.

The previous slide set out the numbers for both parts of the plan. The company would need \$30,000 more in assets and would raise \$10,000 by debt and \$20,000 by equity.

## Problems with percent-of-sales

- Fixed vs. variable costs
- Assets are lumpy
- Have preferences about financing

There are variety of problems with the assumption that everything increases at the same rate as sales.

While it might be reasonable that variable costs increase at the same rate as sales, fixed costs won't (that's why we call them fixed) and so our forecast would likely overestimate future costs.

Assets (machines, buildings, etc.) come in fixed sizes so it's unrealistic to plan on increasing everything by a fixed percentage each year. If you have a warehouse, how do you increase your warehouse size by 3% each year? More realistic is that assets are "lumpy", in other words, they come in fixed sizes. You might either have to buy new warehouse in year one which would provide you with more capacity than you need (and a greater need to raise funds at the start) or you may have to delay your purchase of a new warehouse which would slow the growth of sales.

Finally, most companies don't raise money by increasing equity and debt at the same rate each year. They might have preferences over how they'll get additional funds or want to focus on raising money though one source at a time, perhaps due to fixed costs of issuing new debt or equity. We will discuss this more later in the presentation.

## More complicated models

- Forecast fixed and variable costs separately
- Do not assume assets increase at the rate of growth of sales
  - Make a separate forecast for assets
- Specify how money is raised following financing plan.

If the assumptions behind the percent-of-sales approach are not good approximations, the forecast will need to provide more detail. This may include making separate forecasts for fixed and variable costs (where fixed costs are unchanged and variable costs increase at the same rate as sales) or being specific about when assets are purchased and how big each purchase will be rather than assuming that the amount of assets increase smoothly. Finally, the forecast can connect the financing plan with the asset forecast by indicating how the assets are financed.



## Sources of funding

- Debt (borrowing)
  
- Equity
  - Issue new equity
  - Retained earnings

As mentioned on the previous slide, the financial forecast can specify how the company will choose to raise money. There are basically three options: the firm can use debt (borrow money), the firm can issue new equity, or the firm can reinvest earnings (retained earnings) which is another type of equity financing.

We'll discuss the theory behind choosing the best capital structure in a later lecture, but one common approach is that firms prefer to raise funds in this order:

- 1) Internal funds (retained earnings)
- 2) External funds
  - A) New Debt
  - B) New Equity

We can use this information when forecasting by determining the amount of money being raised and then assuming it is first satisfied by the amount of internal funds available. If there are not enough internal funds, then the remainder would be raised by external funds, first with new debt and then with new equity, subject to any constraints on the targeted capital structure.

In practice, there is a “back and forth” between the investment plan and the financing plan. If the initial forecast shows that the firm would have to obtain external funds, management may instead scale back expansion plans to avoid having to issue new debt or equity. Then the forecast would have to be redone with the new sales assumptions.

## Connections between parts of the financial plan

- Investment Plan: Increase in Assets
- Reinvestment/Dividend Decision
  - How much of earnings are retained
- Financing Plan: Capital Structure
  - Choice of equity and debt

The financing decision connects three separate parts of the business plan.

The investment plan sets out the amount of additional assets that must be purchased.

The income statement and the dividend payment plan sets out the amount of earnings that are available to be reinvested in the company. (If we are committed to returning 60% of earnings back to equity investors as dividends then 40% of earnings are available to be reinvested in the company)

Our target capital structure (the mix of equity and debt and how it is raised) from the financing plan limits the amount of money that can be raised externally.

For example, if the financing plan says that the company will not raise an external funds then the increase in assets is limited by the amount of earnings retained. If the addition to retained earnings is not sufficient to pay for the planned purchase of assets, then either the company will either have to reduce its assets purchases or alternatively reduce their dividend payments in order to reinvest more in the company.

## Capital structure and forecasting models

- Internal Growth Rate
  - $(\text{addition to retained earnings})/(\text{assets})$
  - $\text{IGR} = (\text{plowback ratio})(\text{return on equity})(\text{equity}/\text{assets})$
- Sustainable Growth Rate
  - $\text{Sustainable growth rate} = (\text{plowback ratio})(\text{return on equity})$

If there is a restriction on how funds are raised then there will be a limit on how fast assets can grow which will limit how fast sales can grow.

If a company only uses retained earnings to finance new assets then the rate of growth for the company (in terms of assets) will equal the addition to retained earnings divided by assets. This is called the internal growth rate. The addition to retained earnings equals the amount of equity multiplied by the return on equity multiplied by the plowback ratio (the fraction of earnings that is reinvested in the company). From this equation we can see that the more profitable the company is or the more it reinvests in itself, the faster it will grow.

Sustainable growth rate assumes that the firm will issue no new equity and will keep its debt/equity ratio constant. Imagine that the plow back ratio is 1 (all earnings are reinvested in the company) and earnings are 30% of equity. If we add that back to equity, then equity will grow at 30%. Debt will also have to grow at 30% to keep the debt/equity ratio constant. Since both equity and debt are growing at 30% then assets will grow at 30% as well. If we reduce the plowback ratio, then less money will be added to equity and equity, debt and assets will all grow more slowly.

## More sophisticated models

- Make forecast for sales and assume *some* items (such as working capital) remain proportional to sales.
- Other items (assets, costs, etc) get their own forecasts -> Investment Plan
- Make financing decisions
- Connections between the balance sheet and the income statement
  - Debt (on balance sheet) -> Interest costs (on income statement)
  - Retained Earnings (on income statement) -> Change in equity (on balance sheet)

More sophisticated models will combine the various ideas presented in this presentation. They will make separate forecasts for sales and for items that are not expected to grow proportionately to sales. These forecasts will generate an investment plan for assets. A financing plan will lay out how the money is raised and the effect on the capital structure. The results of the financing plan may constrain the investment plan which will affect the sales forecast and so management will often have to revise the various assumptions until all plans agree.

We can see how the various parts of the business plan interact by looking at the connections between balance sheet items and income statement items. For example, if debt increases (balance sheet), that will increase interest costs (income statement), which will reduce the addition to retained earnings (income statement), which will reduce the increase in equity (balance sheet), which will reduce the increase in assets (balance sheet), which will reduce the increase in earnings (income statement).

## Good forecasting habits

- Excel is not a substitute for your brain
- Have a story to evaluate consistency
- Sensitivity analysis is essential

A few final comments on forecasting. Generally, college classes (including this one) present forecasting as a very mechanistic activity; put a bunch of numbers in a spreadsheet and use some simple formulas to forecast the future. In practice, there's much more judgement involved. When forecasting, you need to ask yourself if the numbers being produced seem reasonable, particularly with respect to sales since it is often the primary driver of the forecast. One way to do this is to have a story for how consumers and competitor firms must behave for the forecasts to come true and then question whether that behavior seems reasonable.

Since forecasts include a number of different assumptions, it's important to perform sensitivity analysis, which involves changing the assumptions to see how the forecast changes. For example, assume that sales grow more slowly than expected and see if that puts stress on the company's cash position. We'll discuss sensitivity analysis in more detail in the section of the course on capital budgeting.