FINANCIAL DECISION MODELS

PROJECTS OVERVIEW – D1

PROJECT INTRODUCTION

Projects to address real-world-scale problems in:

◆ Marketable securities, or

◆ Entity-level projects.

Approach can be either

◆ Design a product, or

◆ Perform a consultant-style research project.

Projects may be:

◆ Generated by you (and approved by instructor)

◆ Drawn from below list of examples.

Logistics:

- Two or three person teams.
- Deliverables
    - Slide deck (Consulting Report or Product Pitch) Specific details to follow.
    - Verbal presentation of deck.
    - Excel, Python code, Database.
    - Due ~ Wednesday 12/5.

Marketable Securities Examples

◆ Risk Hedging (Product)

For any S&P 500 security,

- ◆ Find the best set of 2-5 ETFs to hedge with (monthly or quarterly)
- ◆ Report selected ETFs, projected performance, costs.

For this you need to (among other things):

- ◆ Establish a set of 20-50 ETFs to use as hedging candidates.
- ◆ Establish a database of closing prices of the ETFs and an example subset of S&P 500 stocks.

◆ Trade Sourcing (Consulting)

For any ETF with large, liquid options market

◆ Search ETF's closing prices for (say) bouncing around a two-year low, based on 10-day moving average.

◆ Find deep out of the money puts to sell.
(Maybe use put spread to insure against big losses).

◆ Estimate probabilities of negative gains and returns.

◆ Establish a risk-reward policy for these types of trades.

◆ Determine how many puts to trade per $100K in account, in accordance with probabilities and risk-reward policy.

Example securities:

◆ VXX, TLT

◆ Multi-period Portfolio Optimization (Product)

Consider a portfolio of the SPY +/- Several S&P 500 Sector ETFs. Create a product that aims to outperform the S&P 500 (based on a measure of gain or return over multiple periods and downside risk of same).

Methodology:

◆ Use economic sector reports and other data to determine which sector ETFs to buy/sell at certain times to outperform the S&P 500.

Entity-Level Project Examples

- Purchase Evaluation of "fixer-upper" Entity for Private Equity Firm.
  For a potential target firm (firm to potentially be purchased by PE firm):
  - Assume plan is:
    Purchase, optimize capital structure and operations, sell in 5-6 years.
  - Perform ratio analysis against better-performing comps.
  - Estimate multiple-at-exit (ie: Price/FCF, Price/EBITDA, etc)
    after company has been improved
    (from ratio analysis of better-performing companies).
  - Determine optimum capital structure
    (from algorithm learned in class).
  - Determine achievable operational improvements to EBITDA
    (from ratio analysis with comps).

- ◆ Determine key drivers of Free Cash Flows and model these as random variables (from sensitivity analysis and historical performance).
- ◆ Prepare Random Variable, DCF valuation of the entity, as it would be modified by the PE firm.
- ◆ Make a Go-NoGo recommendation.

- ◆ Financial Plan (Consulting)
    - ◆ Details provided verbally

- Financial Data Analytics (Big Data)
  - See Bank of America Example
  - Involves:
    - Several datasets.
    - Querying, Stats and Probability.
    - SQL or SQL-like features of Python.

Coding-Intensive Examples (Entity-Level or Marketable Securities)

◆ Creating general purpose **Python** code for Pro-forma models.

- ◆ Read historical statements from CSV or online data source.
- ◆ Perform analysis of "% of Sales" projections for each relevent account.
- ◆ User provides:
  - ◆ Rules for certain account projections (instead of % of sales). (cash maintained at 5% sales, etc).
  - ◆ Item to solve for in final projected period.
  - ◆ How many periods of detailed projections to include.
- ◆ Code outputs:
  - ◆ key ending account values
  - ◆ ratio analysis of all projected periods.

- ◆ Creating general purpose ***Python c***ode for entity-valuation models.
  - ◆ Read historical statements from CSV or online data source.
  - ◆ Analyze "% of Sales" projections for each relevant account.
  - ◆ User provides:
    - ◆ Rules for certain account projections (cash maintained at 5% sales, etc).
    - ◆ Terminal value method to apply.
    - ◆ Rocc (opportunity cost of capital).
    - ◆ How many periods of detailed projections to include.
  - ◆ Code determines:
    - ◆ Optimal capital structure.
    - ◆ Key drivers of Free Cash Flows.
    - ◆ RV distributions for these drivers.
    - ◆ Probability distribution of NPV/E with current and optimal Capitalization ratios. (NPV/E = NPV per dollar of equity funds invested).

◆ Automating *Excel* Solutions of "Simulation - Brute-Force Optimization" Problems

    ◆ Use VBA, data-tables to produce results elegantly in Excel.