

Introduction to Finance - II
Quiz 6 *February 26, 2019*

You work as a financial analyst for Ardmore Pools, which makes pumps and filters for freshwater swimming pools and spas. Your boss, Ardmore's CFO, Susan Masterson, has asked you to evaluate a couple of expansion options. With aggressive marketing Susan expects that Ardmore could increase sales by 3,667 freshwater pumps over the course of the first year, falling to 3,000 freshwater pumps per year in years 2, 3, and 4, for \$400 per pump. This expectation is based on two scenarios. The pool construction industry trade group is mounting an aggressive one-year advertising campaign to change both new and existing pools to salt water (from the current chlorinated fresh water format). Therefore, if the trade group's campaign is successful, the incremental sale of freshwater pumps would only be 1,000 per year in years 2, 3, and 4 (for \$400 a piece). Susan says that Ardmore's board of directors agrees that there is a 25% probability that the saltwater campaign would be successful. And therefore there is a 75% probability that salt water will not become more popular, in which case Ardmore would sell 3,667 additional freshwater pumps in each year: 2, 3, and 4, (since $.25 \cdot 1,000 + .75 \cdot 3,667 = 3,000$, which is the expected number of new pumps sold in each of these three years if we undertake the expansion).

The first expansion plan (i.e., the "base case") would entail a \$1 million capital outlay for site preparation, additional equipment, and installation. The capital outlay would occur immediately, and the new equipment could start production almost immediately. This investment qualifies as a 3-year asset under the Internal Revenue Code's Modified Accelerated Cost Recovery program. The depreciation table is provided below. Ardmore would have to maintain \$150,000 worth of additional inventory over the 4-year planning horizon. This equipment is similar to Ardmore's existing equipment in that it can only make freshwater pumps. The manufacturing costs will average \$260 per pump. Production would last for four years at which time the capital would have no salvage value.

Unfortunately waiting is not a viable option since Ardmore would lose out on the new sales to competitors. However, for an additional \$100,000 in capital costs (incurred immediately) Ardmore could install flexible equipment that can manufacture either freshwater or saltwater pumps. If Ardmore installs this more costly equipment then it has flexibility to switch to saltwater pump manufacture after one year. If it switches, Ardmore will incur a one-time cost of switching to the saltwater design of \$200,000 (which would be a tax-deductible expense incurred at Year 1). After switching, Ardmore still expects to be able to manufacture and sell 3,667 saltwater pumps (for \$400 each) in Years 2, 3, and 4 and the cost of producing a saltwater pump will be the same as a freshwater pump in this case. Aside from the initial capital outlay, all of the features of this investment are the same as in the base case. This includes the \$260 manufacturing cost per pump, \$150,000 inventory requirement, and zero salvage value.

Ardmore is a family-owned company that has no debt. It uses a cost of equity of 10% in its financial decisions. Ardmore's marginal income tax rate is 25%.

1. **(40 points)** What is the expected net present value of the base case project?
2. **(55 points)** What is the expected net present value of the flexible equipment?
3. **(5 points)** What should Ardmore Pools do?

MACRS 3-year asset depreciation schedule

| Year | Depreciation (%) |
|------|------------------|
| 1 | 33.33 |
| 2 | 44.45 |
| 3 | 14.81 |
| 4 | 7.41 |