Introduction to Finance - II
Quiz 4 *February 12, 2019*

You are doing a summer internship at Archer Daniels Midland (ADM) in Chicago. ADM's new VP of operations, Waylon Hullinger has asked you to analyze the following problem. Waylon noticed that ADM has paid \$1.5 million to Milwaukee Metal Products (MMP) in each of the past 10 years to repair and maintain its grain elevators throughout the upper Midwest. This is a very predictable expense, and Waylon expects that ADM will continue to have to incur this expense annually, unless it changes its procedures. He worked for MMP and estimates that ADM could build a metal working shop in Moline, staff it with one mechanic, and save money on repairs and maintenance. ADM owns a facility in Moline, and Waylon says that a storage building on site would be suitable to house the proposed machine shop. ADM would have to buy \$2.2 million worth of metal-working equipment, and retrofit the shop for \$800,000. ADM would also have to hire a full-time metal worker at an annual cost of \$140,000. Waylon also estimates that annual utility and maintenance costs for the shop would be \$45,000. The shop would also have to maintain inventory of \$200,000 of metal at all times. The capital equipment is in the 3-year asset class according to the Internal Revenue Service, and the 3-year MACRS depreciation table is provided below. The one worker and the shop would completely replace Milwaukee Metal Products' services. If ADM decides to undertake the project, its new metal shop could be placed into service almost immediately. The value of the "shack" and surrounding land, that would house the new shop is \$500,000. Waylon argues that the value of the shack is not relevant since ADM already owns it. Waylon wants you to assess the economic viability of the project on a 4-year planning horizon. At the end of 4 years the shack would go back to its previous use, the inventory liquidated, and the salvage value of the equipment would be 0.

Waylon also gave you a statistical summary of data that ADM uses in its internal planning. The variance of monthly returns on the market portfolio is 0.001875, and the monthly expected return on the market is 0.0067. The yield to maturity on the 30-year US Treasury bond is 3.1%. ADM has a monthly return variance of 0.007, and its correlation with the market portfolio is 0.4. The market capitalization of ADM's stock is \$23 billion, and ADM has \$8 billion in long-term debt. ADM has a marginal income tax rate of 23%. The yield to maturity on ADM's 30-year bonds is 4.2%.

MACRS 3-year depreciation schedule

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

Under the assumptions provided, what would be the effect of the proposed project on ADM? Show all of your work in a well-organized manner–clearly identifying intermediate calculations so that Mr. Hullinger gives you a full-time job offer.