

**MAS6053 Financial Mathematics Project**  
**Theory of rational option pricing**  
**Due by 4pm on Tuesday, January 24th, 2017**

The purpose of this project is to understand sections 1, 2, 4 and 8 of [Merton 73] (freely available from <http://www.jstor.org/stable/3003143>).

You should produce a written report explaining *in your own words* the main ideas you encounter. Specifically, your project should focus on

- (a) the various equalities and inequalities satisfied by option prices,
- (b) the derivation of the price of the perpetual American put option.

Some of the material in (a) will be familiar from our lectures— **you should not devote much effort to this, unless the article provides you with a novel way of understanding this material.**

Your grade for the project will be a measure of how well I think you are able to learn this new material independently and how well you can communicate it in your own words. You may need to understand unexplained terminology from its context and perhaps from other sources. To illustrate this, consider the concepts of “warrants” and “limited liability” mentioned in the paper: you should understand from the context that warrants are, for the purposes of this paper, the same as options *and hence merit no further attention*; you should also be able to recognize that the “limited liability on the common stock” mentioned in page 157 is referring to the fact that share prices are non-negative. *Terminology needs to be explained only if it is needed to understand an aspect of the paper you are focusing on.*

There is not upper or lower limit on the length of your report, but I expect it to be in the order of 10 pages long (probably no shorter than 5 and no longer than 20).

You are encouraged to use other sources to understand the content of this article. When quoting or referring to the contents of any source, you should indicate the source with a bibliographic reference. You may read and discuss the sources with your fellow students, but the writing of your project must be done individually.

The project is worth 30% of the final mark for the course.

Moty Katzman.

## References

- [Merton 73] Robert C. Merton. *Theory of rational option pricing*. The Bell Journal of Economics and Management Science, Vol. 4, No. 1, Spring, 1973.