The Taxation and the Attitude towards Risk
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In this paper we will analyze the behavior of an economic agent that has an initial endowment $s_0$ and who wants to invest in active with or without risk. The rate of return is given by a random variable $\tilde{e}$ with finite mean and variance. The attitude towards risk is a Von Neumann Morgenstern function. We will determine the optimal portfolio maximizing the expected utility of the final available amount with respect to the percent invested in risky active $x$, from the initial endowment $s_0$.

We will analyze the case when there is a tax with the ratio $t$ for the final available amount and so:

$$S^a(e) = (1 - t)S(e)$$

The influence of the modification of the taxation ratio on the invested amount in the risky active is given by:

$$\frac{dx}{dt} = \frac{x}{1-t} + \frac{1+r}{1-r} \cdot \frac{E\left[U^m\left(S^a(\tilde{e})\left(\tilde{e} - r\right)\right)\right]}{E\left[U^m\left(S^a(\tilde{e})\left(\tilde{e} - r\right)^2\right)\right]}$$

The sign of the derivative $\frac{dx}{dt}$ is influenced by the monotonicity of the absolute risk aversion index, $r_a(\lambda) = -\frac{U''(\lambda)}{U'(\lambda)}$.

We will derive the substitution and income effects and we will show how these effects influence the sign of the derivative $\frac{dx}{dt}$.

Finally, we will analyze the case when the Government subsidize the losses using a tax given by $t_r\left(S(\tilde{e}) - S_0\right)$.

Using the monotonicity of the relative risk aversion index $r_r(s) = -s \frac{U''(s)}{U'(s)}$ we will determine the sign of the derivative:

$$\frac{dx}{dt} = \frac{x}{1-t_r} + \frac{r}{1-t_r} \cdot \frac{E\left[U^m\left(S^a(\tilde{e})\left(\tilde{e} - r\right)\right)\right]}{E\left[U^m\left(S^a(\tilde{e})\left(\tilde{e} - r\right)^2\right)\right]}.$$