Time Factors and Rates

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When measuring change over time, lower-case variables reflect rates while the corresponding upper-case variable connects adjacent discrete periods.[1,2] So, for example, if the annual interest rate is $\mathsf{r} = 0.03$ or three percent, then the annual interest factor is $\mathsf{R} = 1.03$.

Code	Output	Description
`\Rfree`	R	Riskfree interest factor
`\rfree`	r	Riskfree interest return
`\Risky`	$\mathbf{R}$	The return factor on a risky asset
`\risky`	$\mathbf{r}$	The return rate on a risky asset
`\Rport`	$\mathfrak{R}$	The return factor on the entire portfolio
`\rport`	$\mathfrak{r}$	The return rate on the entire portfolio
`\rport`	$\mathfrak{r}$	The return rate on the entire portfolio
`\RSave`	$\underline{\mathsf{R}}$	Return factor earned on positive end-of-period assets
`\rsave`	$\underline{\mathsf{r}}$	Return rate earned on positive end-of-period assets
`\RBoro`	$\bar{\mathsf{R}}$	Return factor paid on debts
`\rboro`	$\bar{\mathsf{r}}$	Return rate paid on debts

Table 1 Factors and Rates

We depart from the upper-lower case scheme when the natural letter to use has an even more natural or urgent use elsewhere in our scheme. A particularly common example occurs in the case of models like Blanchard (1985) in which individual agents are subject to a Poisson probability of death. Because death was common in the middle ages, we use the archaic Gothic font for the death rate; and the probability of survival is the cancellation of the probability of death:

`Code`	LaTeX	Description
`\DieFac`	$\mathfrak{D}$	Probabilty of death
`\LivFac`	$\not{\mathfrak{D}}$	Probability to not die $= (1 - \mathfrak{D})$

Table 2 Special Cases: Factors and Rates

[1] This convention rarely conflicts with the usage we endorse elsewhere of indicating individual-level variables by the lower and aggregate variables by the upper case.

[2] If there is a need for the continuous-time representation, we endorse use of the discrete-time rate defined below. Any author who needs a continuous-time rate, a discrete-time rate, and a discrete-time factor is invited to invent their own notation.

References

Blanchard, Olivier J. (1985): "Debt, Deficits, and Finite Horizons," *Journal of Political Economy*, 93(2), 223–247.