

# Combined Recommendations

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# 1 Modifiers

## Recommendations for Variable Modifiers

The following are useful across many contexts:

<b>Agg</b>	-	Value of something at the aggregate level (as opposed to <b>Ind</b> )
<b>Ind</b>	-	Value of something at the level of an individual (as opposed to <b>Agg</b> )
<b>Lvl</b>	-	Level
<b>Rto</b>	-	Ratio
<b>Bot</b>	-	Lower Value in some range
<b>Top</b>	-	Upper Value in some range
<b>Min</b>	-	Minimum possible Value
<b>Max</b>	-	Maximum possible Value
<b>Shk</b>	-	Shock to the variable being modified

**Table 1** General Purpose Modifiers

Shocks will generally be represented by finite vectors of outcomes and their probabilities. For example, permanent income is called **Perm** and shocks are designated **Shk**

<b>Prbs</b>	-	Probabilities of outcomes (generally a vector, e.g. <b>PermShkPrbs</b> for permanent shocks)
<b>Vals</b>	-	Values (e.g., mean one shock satisfies <b>PermShkVals</b> . <b>PermShkPrbs</b> = 1)

**Table 2** Probabilities

Timing can be confusing because there can be multiple ordered steps within a ‘period.’ We will use **Prev**, **Pres**, **Next** to refer to the current steps within a period, and  $t$  variables to refer to succeeding periods.

<b>[object]tm1</b>	-	object in period $t$ minus 1
<b>[object]tm2</b>	-	object in period $t$ minus 2
<b>[object]Now</b>	-	object in period $t$
<b>[object]tp1</b>	-	object in $t$ plus 1
<b>[object]tpn</b>	-	object in $t$ plus $n$
<b>[object]Prev</b>	-	object in previous subperiod
<b>[object]Curr</b>	-	object in current subperiod
<b>[object]Next</b>	-	object in next subperiod

**Table 3** Timing

For testing and debugging purposes, it is useful to compare numerical values constructed by the code to analytical results available in some special cases. To distinguish the corresponding object in the two cases, we use

Anl	-	The analytical result
Num	-	The numerical result

**Table 4**

## 2 Variables

### 2.1 Single-Letter

The variable definitions below are intended to designate the most common usages of letters in the Roman alphabet. Of course, contributors can use any of these for other purposes, but we prefer that a non-single-letter designation be used when an alternative is contemplated. For example, please do not use *W* for wealth (if some measure of wealth is needed); instead use, say, *Wlth* or *Wealth*.

- A - *Assets After All Actions Accomplished* (end of period)
- B - *Beginning Bank Balances Before* any *Behavior* (beginning-of-period)
- C - *Consumption Choice Connects B to A*
- D - *Debt*
- E - *Labor Effort*
- F - *Production*
- G - *Growth*
- H - *Human wealth*
- I - *Investment*
- J - *Adjustment costs* (e.g., in a *Q* model)
- K - *Capital/beginning of period nonhuman assets*
- L - *Labor supply*
- M - *Market resources* (capital, capital income, and labor income)
- N - *Net wealth including human wealth* ( $= B + H$ )
- P - *Permanent noncapital income*
- Q - *Hayashi/Abel Q*
- R - *Return*
- S - *State*
- T - *Taxes*
- U - *Utility*
- V - *Value*
- W - *Wage*
- X - *Expenditures* (as distinct from consumption; e.g., for durables)
- Y - *Labor income*
- Z - *Leisure in consumption/leisure tradeoff*

## 2.2 Strings

The variable definitions below are intended to designate the most common usages of letters in the Roman alphabet. Of course, contributors can use any of these for other purposes, but we prefer that a non-single-letter designation be used when an alternative is contemplated. For example, please do not use *W* for wealth (if some measure of wealth is needed); instead use, say, `Wlth` or `Wealth`.

<code>Cnd</code>	-	Consumption of nondurable good
<code>Cost</code>	-	Cost of something
<code>Dur</code>	-	Stock of durable good
<code>Div</code>	-	Dividends
<code>House</code>	-	Quantity of housing ( <i>not</i> value, which is quantity $\times$ price)
<code>Perm</code>	-	Permanent income
<code>Tax</code>	-	Quantity of tax paid; a tax rate would be <code>TaxRte</code>
<code>Tran</code>	-	Transitory income

## 3 Parameters

Python Code	LaTeX Code	LaTeX Output	Description
<code>CARA</code>	<code>\CARA</code>	$\alpha$	Coefficient of Absolute Risk Aversion
<code>CRRA</code>	<code>\CRRA</code>	$\rho$	Coefficient of Relative Risk Aversion
<code>kapShare</code>	<code>\kapShare</code>	$\epsilon$	Share of capital in $F(K, L) = K^\epsilon L^{1-\epsilon}$

**Table 5** Special Cases: Factors and Rates

## 4 Factors and Rates

To make the mapping between continuous time and discrete time straightforward, our convention is that lower-case variables reflect rates while the corresponding upper-case variable is the corresponding factor over a discrete interval of time.

So, for example, if the annual interest rate is  $r = 0.03$  or three percent, then the annual interest factor is  $R = 1.03$ .

We predefine the following factors:

There are a few cases in which we must depart from the scheme in which lower case letters are the rate associated with the corresponding upper case letter, most notably when the conventional object is designated by a Greek letter that does not have a widely recognized lower case version.

Python Code	LaTeX Code	LaTeX Output	Description
Rfree	\Rfree	$R$	The riskfree interest rate
Risky	\Risky	$\mathbf{R}$	The return on a risky asset
Rport	\Rport	$\mathfrak{R}$	The return on the entire portfolio

**Table 6** Factors

Python Code	LaTeX Code	LaTeX Output	Description
DeprFac	\DeprFac	$\overline{\Gamma}$	Depreciation factor
deprRte	\deprRte	$\delta$	Depreciation rate
DieFac	\DieFac	$\mathfrak{D}$	Proportion who die
LivFac	\LivFac	$\mathfrak{D}^c$	Proportion who do not die = $(1 - \mathfrak{D})$
DiscFac	\DiscFac	$\beta$	The discount factor: $1/(1 + \vartheta)$
discRte	\discRte	$\vartheta$	The discount rate: $\beta^{-1} - 1$
PopFac	\PopGro	$\Xi$	The growth factor for population
popRte	\popRte	$\xi$	The growth rate for population

**Table 7** Special Cases: Factors and Rates