

PROJECTION TO THE HORIZON

Risk and Asset Allocation - Springer – *symmys.com*

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Formulas and figures in this presentation refer to the book **Risk and Asset Allocation**, Springer.

The notation, say, (5.24) refers to Formula 24 in Chapter 5 of the book

The notation, say, (T4.12) refers to Formula 12 in the Technical Appendices for Chapter 4, which can be downloaded from www.symmys.com

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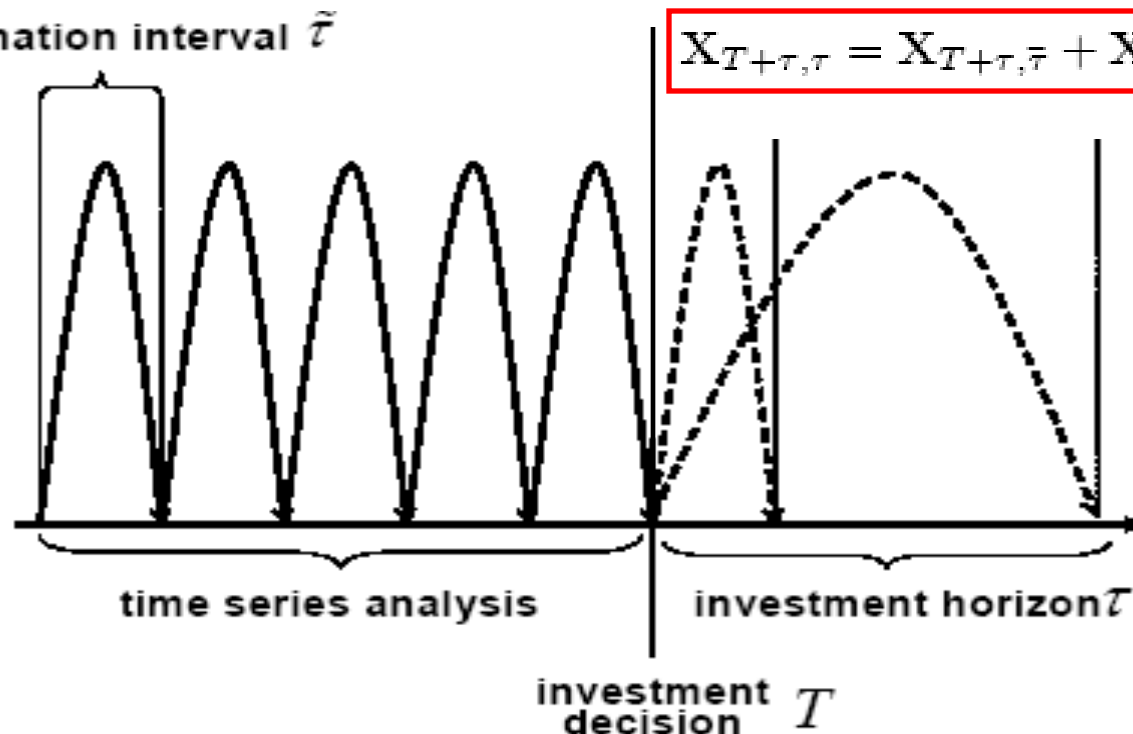
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estimation interval $\tilde{\tau}$

$$X_{T+\tau,\tau} = X_{T+\tau,\tilde{\tau}} + X_{T+\tau-\tilde{\tau},\tilde{\tau}} + \cdots + X_{T+\tilde{\tau},\tilde{\tau}}.$$

(3.60)

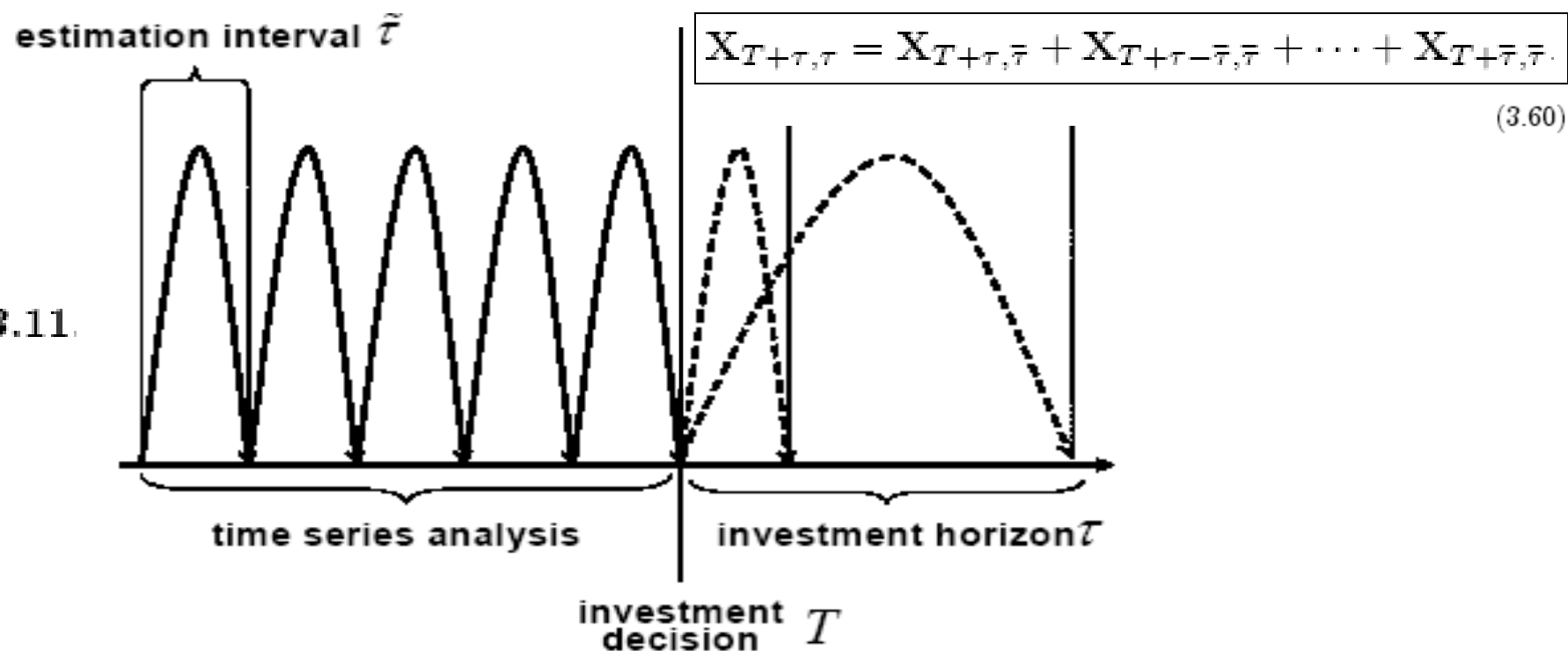
Fig. 3.11.



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Fig. 3.11.

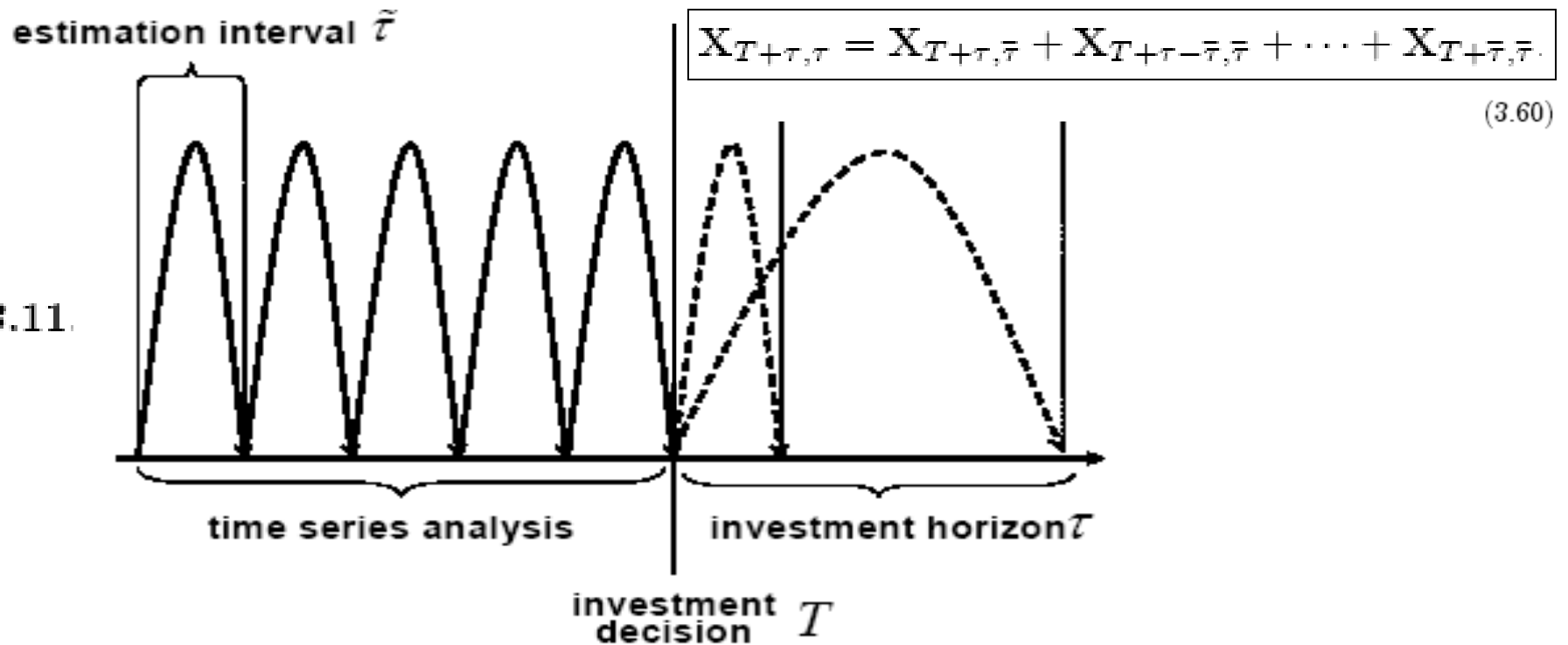


$$\phi_{X_{T+\tau, \tau}} = \left(\phi_{X_{t, \tilde{\tau}}} \right)^{\frac{\tau}{\tilde{\tau}}} \quad (3.64)$$

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Fig. 3.11.



$$\phi_{\mathbf{X}_{T+\tau, \tau}} = \left(\phi_{\mathbf{X}_{t, \tilde{\tau}}} \right)^{\frac{\tau}{\tilde{\tau}}} \quad (3.64)$$



“square-root” rule

$$\text{Cov} \{ \mathbf{X}_{T+\tau, \tilde{\tau}} \} = \frac{\tau}{\tilde{\tau}} \text{Cov} \{ \mathbf{X}_{t, \tilde{\tau}} \} \quad (3.76)$$

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$f_{X_t, \tau}$

$f_{X_{T+\tau}, \tau}$

?

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$$\mathcal{F}[v](\mathbf{y}) \equiv \int_{\mathbb{R}^N} e^{i\mathbf{y}'\mathbf{x}} v(\mathbf{x}) d\mathbf{x}. \quad (\text{B.34})$$

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The diagram illustrates the relationship between functions at different time points and their projections to the horizon. It features two equations with arrows pointing from them towards a central equation.

$$\begin{array}{ccc} f_{\mathbf{X}_{t, \bar{\tau}}} & & f_{\mathbf{X}_{T+\tau, \tau}} \\ \nearrow & & \nwarrow \\ \phi_{\mathbf{X}} = \mathcal{F}[f_{\mathbf{X}}] & & f_{\mathbf{X}} = \mathcal{F}^{-1}[\phi_{\mathbf{X}}] \\ (2.14) & & (3.65) \end{array}$$
$$\phi_{\mathbf{X}_{T+\tau, \tau}} = \left(\phi_{\mathbf{X}_{t, \bar{\tau}}} \right)^{\frac{\tau}{\bar{\tau}}} \quad (3.64)$$

$$\mathcal{F}[v](\mathbf{y}) \equiv \int_{\mathbb{R}^N} e^{i\mathbf{y}'\mathbf{x}} v(\mathbf{x}) d\mathbf{x}. \quad (\text{B.34})$$

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$$\begin{array}{ccc}
 f_{\mathbf{X}_{t,\bar{\tau}}} & & f_{\mathbf{X}_{T+\tau,\tau}} \\
 \phi_{\mathbf{X}} = \mathcal{F}[f_{\mathbf{X}}] & \xrightarrow{\quad} & f_{\mathbf{X}} = \mathcal{F}^{-1}[\phi_{\mathbf{X}}] \\
 (2.14) & & (3.65)
 \end{array}$$

$$\phi_{\mathbf{X}_{T+\tau,\tau}} = \left(\phi_{\mathbf{X}_{t,\bar{\tau}}} \right)^{\frac{\tau}{\bar{\tau}}} \quad (3.64)$$

$$\mathcal{F}[v](\mathbf{y}) \equiv \int_{\mathbb{R}^N} e^{i\mathbf{y}'\mathbf{x}} v(\mathbf{x}) d\mathbf{x}. \quad (\text{B.34})$$

$$[u * v](\mathbf{x}) \equiv \int_{\mathbb{R}^N} u(\mathbf{y}) v(\mathbf{x} - \mathbf{y}) d\mathbf{y}. \quad (\text{B.43})$$

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$$\mathcal{F}[u * v] = \mathcal{F}[u] \mathcal{F}[v] \quad (\text{B.45})$$

$$\begin{array}{ccc}
 f_{\mathbf{X}_{t,\bar{\tau}}} & & f_{\mathbf{X}_{T+\tau,\tau}} \\
 \phi_{\mathbf{X}} = \mathcal{F}[f_{\mathbf{X}}] & \xrightarrow{\quad} & f_{\mathbf{X}} = \mathcal{F}^{-1}[\phi_{\mathbf{X}}] \\
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 \end{array}$$

$$\phi_{\mathbf{X}_{T+\tau,\tau}} = \left(\phi_{\mathbf{X}_{t,\bar{\tau}}} \right)^{\frac{\tau}{\bar{\tau}}} \quad (3.64)$$

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