ADDITIVE ERROR MODELS Trend

IICIIU		Geagonai	
	N	Α	M
N	$y_t = \ell_{t-1} + \varepsilon_t$	$y_t = \ell_{t-1} + s_{t-m} + \varepsilon_t$	$y_t = \ell_{t-1} s_{t-m} + \varepsilon_t$
	$\ell_t = \ell_{t-1} + \alpha \varepsilon_t$	$\ell_t = \ell_{t-1} + \alpha \varepsilon_t$	$\ell_t = \ell_{t-1} + \alpha \varepsilon_t / s_{t-m}$
		$s_t = s_{t-m} + \gamma \varepsilon_t$	$s_t = s_{t-m} + \gamma \varepsilon_t / \ell_{t-1}$
	$y_t = \ell_{t-1} + b_{t-1} + \varepsilon_t$	$y_t = \ell_{t-1} + b_{t-1} + s_{t-m} + \varepsilon_t$	$y_t = (\ell_{t-1} + b_{t-1})s_{t-m} + \varepsilon_t$
Α	$\ell_t = \ell_{t-1} + b_{t-1} + \alpha \varepsilon_t$	$\ell_t = \ell_{t-1} + b_{t-1} + \alpha \varepsilon_t$	$\ell_t = \ell_{t-1} + b_{t-1} + \alpha \varepsilon_t / s_{t-m}$
	$b_t = b_{t-1} + \beta \varepsilon_t$	$b_t = b_{t-1} + \beta \varepsilon_t$	$b_t = b_{t-1} + \beta \varepsilon_t / s_{t-m}$
		$s_t = s_{t-m} + \gamma \varepsilon_t$	$s_t = s_{t-m} + \gamma \varepsilon_t / (\ell_{t-1} + b_{t-1})$
	$y_t = \ell_{t-1} + \phi b_{t-1} + \varepsilon_t$	$y_t = \ell_{t-1} + \phi b_{t-1} + s_{t-m} + \varepsilon_t$	$y_t = (\ell_{t-1} + \phi b_{t-1}) s_{t-m} + \varepsilon_t$
$\mathbf{A_d}$	$\ell_t = \ell_{t-1} + \phi b_{t-1} + \alpha \varepsilon_t$	$\ell_t = \ell_{t-1} + \phi b_{t-1} + \alpha \varepsilon_t$	$\ell_t = \ell_{t-1} + \phi b_{t-1} + \alpha \varepsilon_t / s_{t-m}$

Seasonal

A_d $\ell_t = \ell_{t-1} + \phi b_{t-1} + \alpha \varepsilon_t$ $b_t = \phi b_{t-1} + \beta \varepsilon_t$

 $v_t = \ell_{t-1} (1 + \varepsilon_t)$

 $\ell_t = \ell_{t-1} (1 + \alpha \varepsilon_t)$

 $y_t = (\ell_{t-1} + b_{t-1})(1 + \varepsilon_t)$

 $\ell_t = (\ell_{t-1} + b_{t-1})(1 + \alpha \varepsilon_t)$

 $b_t = b_{t-1} + \beta(\ell_{t-1} + b_{t-1})\varepsilon_t$

 $v_t = (\ell_{t-1} + \phi b_{t-1})(1 + \varepsilon_t)$

N

Trend

Ν

Α

 A_d

$b_t = \phi b_{t-1} + \beta \varepsilon_t$

$$s_t = s_{t-m} + \gamma \varepsilon_t$$

MULTIPLICATIVE ERROR MODELS

 $b_t = \phi b_{t-1} + \beta (\ell_{t-1} + \phi b_{t-1}) \varepsilon_t$ $b_t = \phi b_{t-1} + \beta (\ell_{t-1} + \phi b_{t-1} + s_{t-m}) \varepsilon_t$

 $v_t = (\ell_{t-1} + s_{t-m})(1 + \varepsilon_t)$

 $\ell_t = \ell_{t-1} + \alpha(\ell_{t-1} + s_{t-m})\varepsilon_t$

 $s_t = s_{t-m} + \gamma (\ell_{t-1} + s_{t-m}) \varepsilon_t$

 $y_t = (\ell_{t-1} + b_{t-1} + s_{t-m})(1 + \varepsilon_t)$

 $b_t = b_{t-1} + \beta(\ell_{t-1} + b_{t-1} + s_{t-m})\varepsilon_t$

 $s_t = s_{t-m} + \gamma (\ell_{t-1} + b_{t-1} + s_{t-m}) \varepsilon_t$

 $v_t = (\ell_{t-1} + \phi b_{t-1} + s_{t-m})(1 + \varepsilon_t)$

 $s_t = s_{t-m} + \gamma (\ell_{t-1} + \phi b_{t-1} + s_{t-m}) \varepsilon_t$

 $\ell_t = \ell_{t-1} + b_{t-1} + \alpha(\ell_{t-1} + b_{t-1} + s_{t-m}) \varepsilon_t$

 $\ell_t = (\ell_{t-1} + \phi b_{t-1})(1 + \alpha \varepsilon_t)$ $\ell_t = \ell_{t-1} + \phi b_{t-1} + \alpha (\ell_{t-1} + \phi b_{t-1} + s_{t-m})\varepsilon_t$ $\ell_t = (\ell_{t-1} + \phi b_{t-1})(1 + \alpha \varepsilon_t)$

Seasonal

Α

$$s_t = s_{t-m} + \gamma \varepsilon_t / (\ell_{t-1} + \phi b_{t-1})$$

 $y_t = \ell_{t-1} s_{t-m} (1 + \varepsilon_t)$

 $\ell_t = \ell_{t-1}(1 + \alpha \varepsilon_t)$

 $s_t = s_{t-m}(1 + \gamma \varepsilon_t)$

 $s_t = s_{t-m}(1 + \gamma \varepsilon_t)$

 $s_t = s_{t-m}(1 + \gamma \varepsilon_t)$



M

 $v_t = (\ell_{t-1} + \phi b_{t-1}) s_{t-m} (1 + \varepsilon_t)$

 $b_t = \phi b_{t-1} + \beta (\ell_{t-1} + \phi b_{t-1}) \varepsilon_t$

$y_t = (\ell_{t-1} + b_{t-1})s_{t-m}(1 + \varepsilon_t)$ $\ell_t = (\ell_{t-1} + b_{t-1})(1 + \alpha \varepsilon_t)$ $b_t = b_{t-1} + \beta(\ell_{t-1} + b_{t-1})\varepsilon_t$

$$\begin{array}{lll} y_{t} = \ell_{t-1} + b_{t-1} + s_{t-m} + \varepsilon_{t} & y_{t} = (\ell_{t-1} + b_{t-1})s_{t-m} + \varepsilon_{t} \\ \ell_{t} = \ell_{t-1} + b_{t-1} + \alpha \varepsilon_{t} & \ell_{t} = \ell_{t-1} + b_{t-1} + \alpha \varepsilon_{t}/s_{t-m} \\ b_{t} = b_{t-1} + \beta \varepsilon_{t} & b_{t} = b_{t-1} + \beta \varepsilon_{t}/s_{t-m} \end{array}$$

$/s_{t-m}$ $+b_{t-1}$)

 $b_t = \phi b_{t-1} + \beta \varepsilon_t / s_{t-m}$