Appendix. ARIMA models

A) All suicides ARIMA model \((0,0,1)(0,1,1)_{12}\)

\[(1 - B^{12})y_t = \theta + (1 - \theta_{12}B^{12})a_t\]

B) Male suicides ARIMA model \((0,0,0)(0,1,1)_{12}\)

\[(1 - B^{12})y_t = \theta + (1 - \theta_{12}B^{12})a_t\]

C) Female suicides ARIMA model \((1,0,1)(0,1,1)_{12}\)

\[(1 - B^{12})y_t = \theta + \frac{(1 - \theta B)(1 - \theta_{12}B^{12})}{(1 - \phi B)}a_t\]

D) All suicides + potentially misclassified suicides

ARIMA model \((1,0,1)(0,1,1)_{12}\)

\[(1 - B^{12})y_t = \theta + \frac{(1 - \theta B)(1 - \theta_{12}B^{12})}{(1 - \phi B)}a_t\]

FINAL MODELS

\[U_t = W_t + f(I_t)\]

where

\[W_t = Y_t - Y_{t-12}\]

and \(f(I_t)\) is the intervention component of the model

Intervention components

a) Abrupt sustained

\[f(I_t) = \omega_0 I_t\]

where \(I_t\) is a step function such that

\[I_t = 0\] prior to the event

\[= 1\] thereafter
b) Gradual sustained
\[ f(I_t) = \frac{\omega_0}{1 - \delta_t B} I_t \]

where \( I_t \) is a step function such that
\( I_t = 0 \) prior to the event
\( = 1 \) thereafter

c) Abrupt temporary
\[ f(I_t) = \frac{\omega_0}{1 - \delta_t B} (1 - B) I_t \]

where \( I_t \) is a pulse function such that
\( I_t = 0 \) prior to the intervention
\( = 1 \) at the moment of the intervention
\( = 0 \) thereafter

ARIMA Models Including Intervention Component

A) All suicides
\[ U_t = \theta + (1 - \theta_{12} B^{12}) a_t + \omega_0 I_{342} \]

B) Male suicides
\[ U_t = \theta + (1 - \theta_{12} B^{12}) a_t + \omega_0 I_{310} + \omega_0 I_{342} + \frac{\omega_0}{1 - \delta_t B} (1 - B) I_{352} \]

C) Female suicides
\[ U_t = \theta + \frac{(1 - \theta_t B)(1 - \theta_{12} B^{12})}{(1 - \phi_t B)} a_t + \omega_0 I_{341} \]

D) All suicides + potentially misclassified suicides
\[ U_t = \theta + \frac{(1 - \theta_t B)(1 - \theta_{12} B^{12})}{(1 - \phi_t B)} a_t + \omega_0 I_{353} \]
References


