b) For us to be able to calculate the impulse Response Functions, we need to rewrite the model as a VMA(∞)!

Reduced form model in a VMA(∞) form:

$$x_t = \mu + e_t + A_1 e_{t-1} + A_1^2 e_{t-2} + \dots$$

↳ in matrix form:

$$\begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} \bar{y} \\ \bar{z} \end{bmatrix} + \sum_{i=0}^{\infty} \begin{bmatrix} 0{,}39 & 0{,}69 \\ 0{,}039 & 0{,}33 \end{bmatrix} \begin{bmatrix} e_{1t-i} \\ e_{2t-i} \end{bmatrix}$$

As e_{1t} and e_{2t} are the linear combination of the structural errors, directly, we cannot infer anything from them. If our goal with the impulse Response Functions is to understand how a specif shock impacts a variable, we should rewrite the model in terms of the original shocks. (Recall that $B^{-1}\varepsilon_t = e_t$)

So,

$$\begin{bmatrix} e_{1t} \\ e_{2t} \end{bmatrix} = \frac{1}{1 - b_{12} b_{21}} \begin{bmatrix} 1 & -b_{12} \\ -b_{21} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{yt} \\ \varepsilon_{zt} \end{bmatrix}$$

$$\begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} \bar{y} \\ \bar{z} \end{bmatrix} + \frac{1}{1-b_{12} b_{21}} \sum^{\infty} \begin{bmatrix} 0{,}39 & 0{,}69 \\ 0{,}039 & 0{,}33 \end{bmatrix} \begin{bmatrix} 1 & -b_{12} \\ -b_{21} & 1 \end{bmatrix} \begin{bmatrix} \varepsilon_{yt-i} \\ \varepsilon_{zt-i} \end{bmatrix}$$

if, $$\phi_i = \frac{A^i}{1-b_{12}b_{21}} \begin{bmatrix} 1 & -b_{12} \\ -b_{21} & 1 \end{bmatrix}$$

Then,

$$\begin{bmatrix} y_t \\ z_t \end{bmatrix} = \begin{bmatrix} \bar{y} \\ \bar{z} \end{bmatrix} + \sum^{\infty} \begin{bmatrix} \phi_{11}(i) & \phi_{12}(i) \\ \phi_{21}(i) & \phi_{22}(i) \end{bmatrix} \begin{bmatrix} \varepsilon_{yt-i} \\ \varepsilon_{zt-i} \end{bmatrix}$$

The response of Y_t to a unit shock of z_t, at impact, is represented by $\phi_{12}(0)$ and the effect of z_t in y_{t+1} is represented by $\phi_{12}(1)$. In theory, we could calculate the values of all impulse response functions $\phi_{11}(i)$, $\phi_{12}(i)$, $\phi_{21}(i)$ and $\phi_{22}(i)$. However, since VAR is underidentified, we cannot ~~ecd~~ retrive all the coefficients of the structural form. Thus, we must make an assumption regarding how y_t and z_t relate contemporaneously. Without that assumption, it is not possible to calculate the numerical response of Y_t and y_{t+1} to a shock of z_t.

Hence, answering the question of the need to identify the model, the answer is yes if you want to understand the impact of exogenous shocks or if you want to understand how Y_t and z_t & relate contemporaneously. However, if your goal is to forecast, or only to understand how past lags of z_t impact y_t, you don't need to identify the model.