$$\mathbf{A} = \begin{pmatrix} 0 & 0 & 0 & 0 \\ a_{21} & 0 & 0 & 0 \\ a_{31} & 0 & 0 & a_{34} \\ a_{41} & 0 & 0 & 0 \end{pmatrix}; \ \mathbf{B} = \begin{pmatrix} b_1 & 0 \\ 0 & b_2 \\ 0 & 0 \\ 0 & 0 \end{pmatrix}; \ \mathbf{C} = \begin{pmatrix} b_1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & b_2 & a_{21}b_1 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & a_{31}b_1 & 0 & a_{34}a_{41}b_1 & 0 & 0 & 0 \\ 0 & 0 & a_{41}b_1 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

$$N = 4, \ M = 2, \ \text{rank}(\mathbf{C}) = 4 = N$$