

Example 1. Consider an economy with 3 industries/products. Suppose the input matrix is

$$A = \begin{bmatrix} 0.2 & 0.3 & 0.2 \\ 0.4 & 0.1 & 0.2 \\ 0.1 & 0.3 & 0.2 \end{bmatrix}$$

and the final demands for the 3 products are $d_1 = 10$, $d_2 = 5$, and $d_3 = 6$.

- What are the primary inputs of each product?
- What is the required output of the 3 industries?
- Find the total required amount of primary inputs for this economy.

a.

$$a_{01} = 1 - (0.2 + 0.4 + 0.1) = 0.3$$
$$a_{02} = 1 - (0.3 + 0.1 + 0.3) = 0.3$$
$$a_{03} = 1 - (0.2 + 0.2 + 0.2) = 0.4$$

b.

$$I - A = \begin{bmatrix} 0.8 & -0.3 & -0.2 \\ -0.4 & 0.9 & -0.2 \\ -0.1 & -0.3 & 0.8 \end{bmatrix}$$

$$X = (I - A)^{-1} D \approx \begin{bmatrix} 1.72 & 0.78 & 0.63 \\ 0.89 & 1.62 & 0.63 \\ 0.55 & 0.70 & 1.56 \end{bmatrix} \begin{bmatrix} 10 \\ 5 \\ 6 \end{bmatrix} \approx \begin{bmatrix} 24.84 \\ 20.68 \\ 18.38 \end{bmatrix}$$

c. Total required amount of primary inputs

$$= a_{01} x_1 + a_{02} x_2 + a_{03} x_3$$

$$\approx 0.3(24.84) + 0.3(20.68) + 0.4(18.38)$$

$$\approx 21$$

How much does industry 2 pay industry 3?

$$a_{32} x_2 \approx 0.3(20.68) = 6.204$$