Let $d_{i0}D_k$ be the change in country $i$'s expenditures; the $k$th step impact of the indirect effect on country $i$ equals

$$d_{i0}Y_{k+1}^i = \frac{D^i}{Y^i}d_{i0}D_k^i + \frac{X^i}{Y^i} \sum_{j\neq i} M^{j,i}d_{j0}D_k^j,$$

(1)

$$d_{i0}D_{k+1}^i = \frac{D^i}{Y^i}d_{i0}Y_{k+1}^i.$$

(2)

Equation (1) states that the drop in the output of country $i$ is the drop in its own expenditure,

$$\frac{D^i}{Y^i}d_{i0}D_k^i,$$

plus the drop in total exports to all its trading partners (denoted by $M^{j,i}, j \neq i$),

$$\sum_{j\neq i} \frac{M^{j,i}}{Y^i}d_{j0}D_k^j,$$

weighted by the share of exports in output

$$\frac{X^i}{Y^i}.$$

Equation (2) then translates the drop in output into the next step's drop in expenditure. Adding up these elements yields our estimate

$$d_{i0}Y_i = \sum_{k=1}^K d_{i0}Y_k^i$$

of the effect of a drop in some countries' expenditures on country $i$'s output, taking into account all trade interlinkages.