Let $d_\% D_k^i$ be the change in country i's expenditures; the kth step impact of the indirect effect on country i equals

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

(2) $$d_\% D_{k+1}^i = \frac{D^i}{Y^i} d_\% Y_{k+1}^i.$$

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

$$\frac{D_i}{Y^i} d_\% D_k^i,$$

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

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

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

$$d_\% Y^i \approx \sum_{k=1}^{K} d_\% Y_k^i$$

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