Can we get the balances right when working with monetary and physical input-output tables?

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Suppose we have, for year 0, a monetary input-output table (MIOT) and a corresponding physical input-output table (PIOT) in mass units. Both tables are balanced, meaning that for each industry the output (i.e. the sum of all deliveries in a row) equals the total amount of inputs (i.e. the sum of all deliveries in a column). In the MIOT, value added items and imports are part of the inputs. In the PIOT, the use of natural resources and the generation of emissions and waste are included as inputs. Next we would like to run some exercises for year 1. Starting with an arbitrary final demand vector in monetary terms, we can calculate the new outputs and construct a new MIOT for year 1. Using information for both tables in year 0, we can also â€œtranslateâ€• the monetary final demands into mass units and run the physical IO model and construct a new PIOT. Alternatively, we can â€œtranslateâ€• the MIOT for year 1 into mass units. In this exercise, the new MIOT will be balanced, but the new PIOT will generally not be balanced. We show that both tables in year 1 are balanced only under the strong assumption of â€œnear homogeneous pricesâ€•. That is, only if the price (per mass unit) of an industryâ€™s sales is the same across other industries and final demand categories that buy the products. Notice that near price homogeneity is a necessary condition for getting both balances right. Because it is unlikely to hold in real world cases there will always be exercises (i.e. final demand vectors in year 1) for which one of the balances will not hold.