MICAT

Multiple Impacts Calculation Tool

Empirical basis of Economic Impacts on GDP

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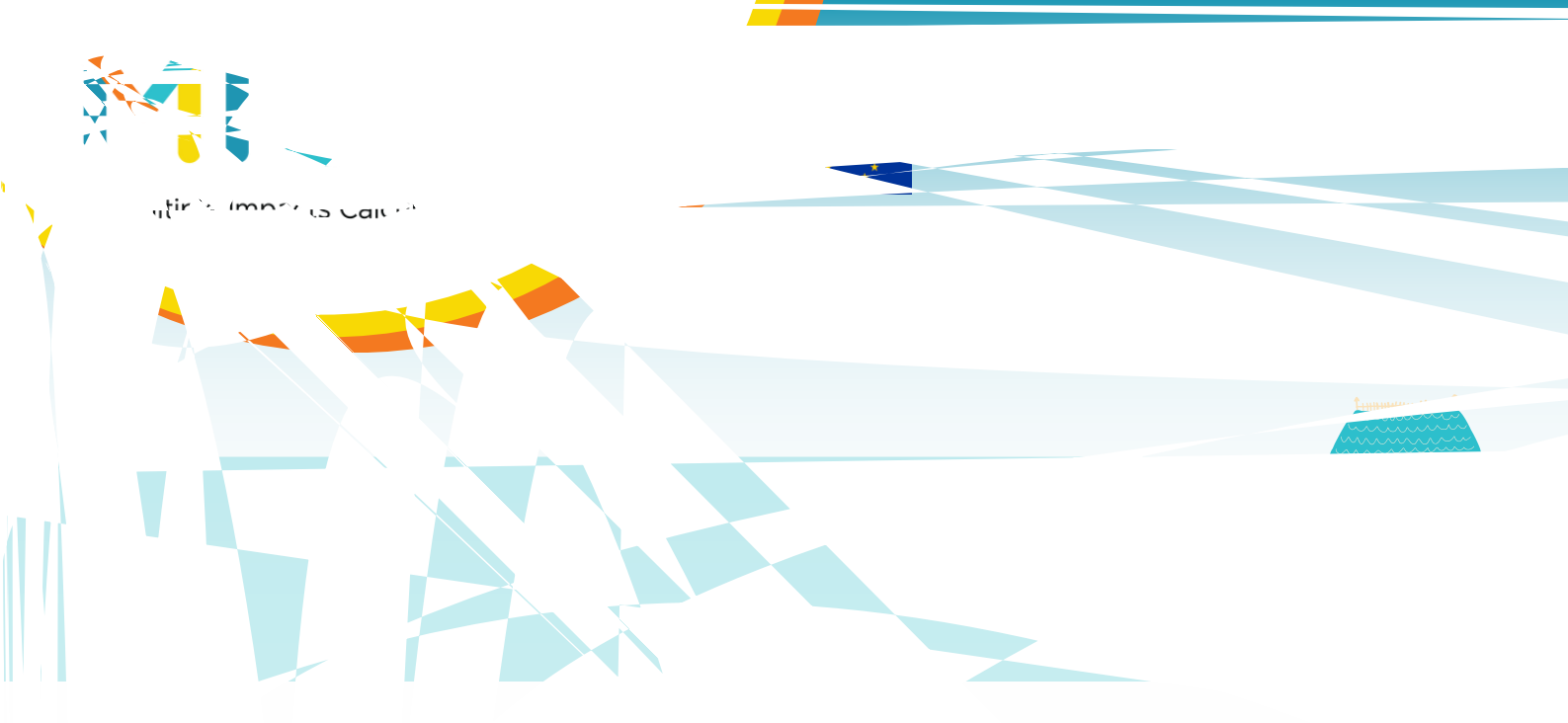
E3-Modelling



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$$coeffGVA_j = \sum_i GVART_i \bullet L_{i,j} \quad (1)$$

where:

$GVART_i$: the ratio of gross value added to total supply for the industry I derived by the IO table.

$L_{i,j}$: the ij-element of the Leontief inverse Matrix $L = (I - A)^{-1}$, where i is the sector providing intermediate inputs to the production of sector j

$coeffGVA_j$: the total gross value added that will be generated in the economy for an additional demand of 1 m€ in sector j.

Leontief Inverse Matrix L:

$$L = (I - A)^{-1} \quad (2)$$

I: Identity matrix

A: direct requirements matrix, the ratio of the intermediate consumption to total supply for each industry.

The **third step** of our methodological approach assumes a table that associates the investment expenditure of each energy efficiency measure to the specific demand of one goods and services. This table aims to allocate the additional generated demand to each of the 65 identified economic activities so that the impacts of energy efficiency measures are dispersed over a number of NACE sectors. The table has been constructed according to expert judgement and thus changing the default assumptions of sectoral allocation by energy efficiency measure can be redefined by the users. Below, in Table 1 we provide a few examples of the allocation of demand by economic activity for the measures of "Building envelope", "Heating fuel switch", and "Energy efficient heating". The numbers in Table 1 express the shares by which the investment expenditure is allocated to each economic activity.

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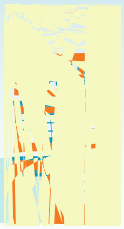

As a next step, the GVA multipliers of each of the sectors identified in the table of sectoral allocation are then multiplied by the respective share in Table 1 to provide the overall Employment coefficient in jobs per 1m. € of investments. Finally, to estimate the annual additional employment generated by investment for energy saving measures we multiply the investment expenditure by measure with the above coefficient as shown in the equation (3) below.

$$coeffTOTGVA_{m,c} = \sum_{j} coeffGVA_{j,m,c} \bullet es_{j,m} \quad (3)$$

where,

j : subsector/activities
m : measure / end-use
c : country
$es_{j,m}$: Allocation share of Energy Saving Investment (m) to sector (j)

At the final step, we estimate the economy-wide GDP generation by applying the level of expenditure by type of measure with the gross value added effect generated in the total economy by 1 m€ expenditure, see equation (4).

Methodological challenges

The 2015 SIOT tables from Bulgaria are not available on Eurostat. Czechia, Ireland, Luxemburg and Malta data are deficient. Sweden data are unbalanced (i.e., SIOT is not symmetric) however this country is not excluded. The GVA impact of certain energy saving measures cannot be quantified, thus by default cannot be calculated, as these cannot be associated with the purchase of specific economic activities or are too generic. The methodology assumes only the GVA impacts from the generated additional demand, thus not assuming any other structural changes, e.g. due to the drop of activity in certain sectors, nor the effects of changes in income and prices or the effects on trade balance due to changes in energy imports and exports. Finally, the methodology relies on the allocation of investment expenditure to demand by economic activities, which is based on expert judgement and assumed uniform by country and sector that applies the measures.

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Conclusion

Below we provide examples for the calculation of the impact on GDP for three selected EU Member States, namely Germany, Italy and Poland.

Germany

			Annual energy saving expenditure in million €						
Subsector	Measure	Country	2020	2025	2030	2035	2040	2045	2050
Machinery	Space heating and cooling	Germany	150	150	150	150	150	150	150
			Annual GVA generated by investment for energy saving measures						
Coefficient for GVA Effect in m. € per 1m. € of investments			2020	2025	2030	2035	2040	2045	2050
0.62			93.5	93.5	93.5	93.5	93.5	93.5	93.5

Table 2: Calculation of the impact on GDP for Germany

Therefore, it can be derived that for each million € invested into Machinery industry for Space heating and cooling - energy efficient measure, 0.62 million are annually generated as GVA, thus a 150 million € - Investment would annually generate 93.5 million GVA.

Italy

			Annual investments in million €						
Subsector	Measure	Country	2020	2025	2030	2035	2040	2045	2050
Average tertiary	Building envelope	Italy	150	150	150	150	150	150	150
			Annual GVA generated by investment for energy saving measures						
Coefficient for GVA Effect in m. € per 1m. € of investments			2020	2025	2030	2035	2040	2045	2050
0.72			108.7	108.7	108.7	108.7	108.7	108.7	108.7

Table 3: Calculation of the impact on GDP for Italy