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APPLYING A QUANTITATIVE DECOUPLING INDICATOR AS A METHODOLOGY TO EVALUATE THE SUSTAINABILITY PROPERTIES OF AN ECONOMY

September 25, 2017

Decoupling is trendy

“Decoupling economic growth from natural resource use is fundamental to sustainable development.”

“Without decoupling, sustainable development cannot happen.”

OECD Observer

OECD

Every year, the European Environment Agency shall publish a report /…/ including on decoupling of waste generation from economic growth and on the transition towards a circular economy.

European Commission

Decoupling pops up in all sustainable policy plans and legislation

But what is decoupling?

OECD definition:

Decoupling occurs when

- the growth rate of an environmental pressure EP
- is less
- than that of its economic driving force DF
- over a given period

Environmental pressures:

E.g. waste generation, CO_2 emissions, biodiversity degradation…

Driving force:

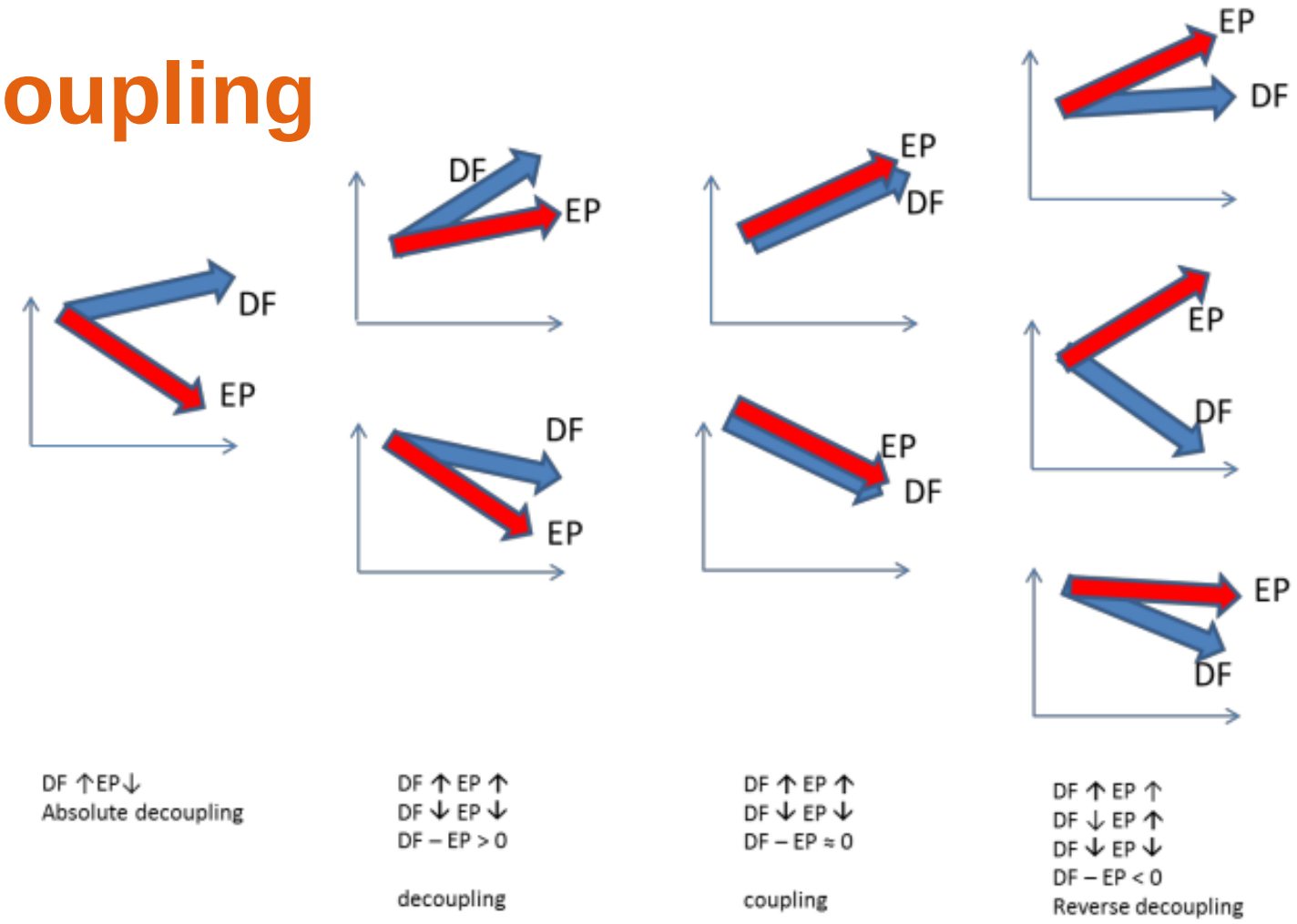
E.g. economic growth (GDP), growth of consumption, demography, …

A given period:

Trends are more important than absolute values

Decoupling is a nicely defined concept for trend evaluation

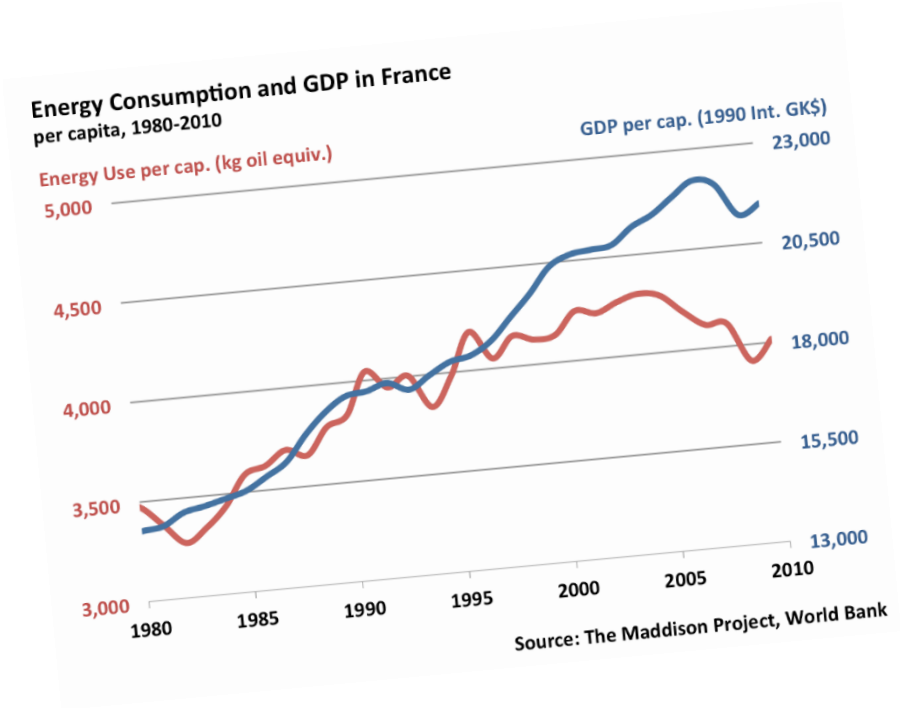
Kinds of decoupling

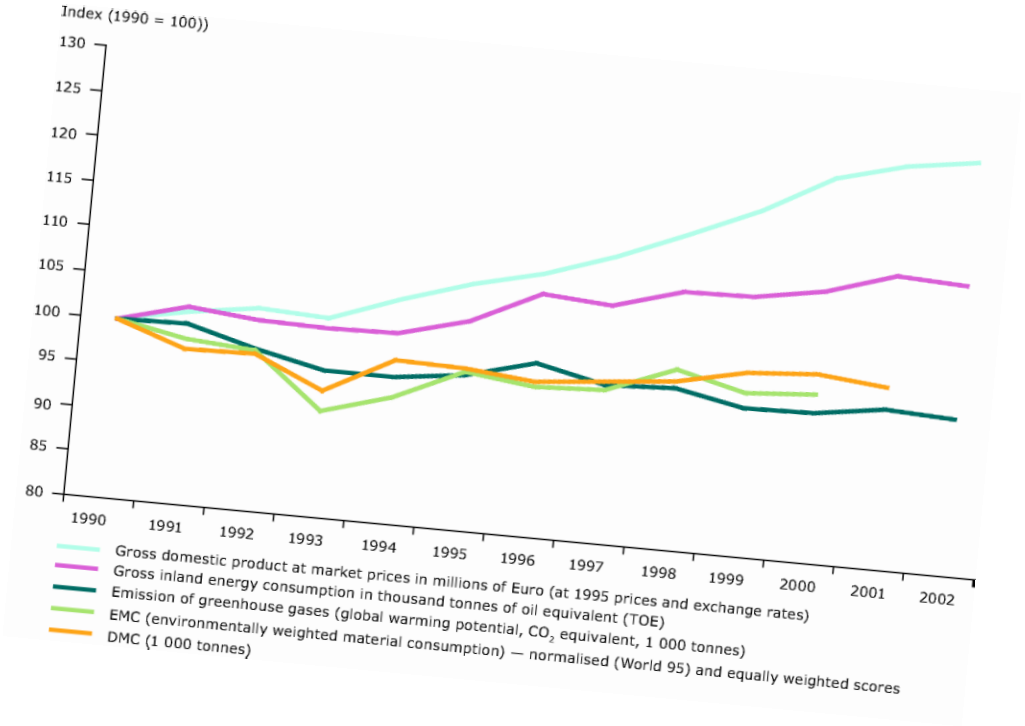


Absolute decoupling, relative decoupling, coupling, reverse decoupling

Figure Arcadis Mike Van Acoleyen, free to use with source reference)

How to assess decoupling?





World Bank (Maddison Project), European Environmental Agency (Relative decoupling of resource use and economic growth in the EU-15)

Assessing decoupling should be more than graphically comparing lines

How to assess decoupling quantitatively

$$D_{(y-5)\rightarrow y} = \left(b(DF)_{(y-5)\rightarrow y} - b(EP)_{(y-5)\rightarrow y}\right)$$

With

$D_{(y-5)->y}$:	the decoupling indicator for a time interval of five years from y-5 to y
$b(EP)_{(y-5)->y}$:	the slope of the linear regression of the environmental pressure over the last five years | EP expressed as an index with y-5 = 100
$b(DF)_{(y-5)->y}$:	the slope of the linear regression of the driving force over the last five years | DF expressed as an index with y-5 = 100
EP:	environmental pressure, for example generation of municipal or household waste, database EUROSTAT [env_wasmun].
DF:	driving force, for example private consumption expenditure, database EUROSTAT [nama_co3_k].

A quantitative formula to compare slopes of EP and DF

leading to a ‘single figure’ harmonised decoupling indicator

How to assess decoupling quantitatively

$$D_{(y-5)\to y} = \left(b(DF)_{(y-5)\to y} - b(EP)_{(y-5)\to y}\right)$$

D > 2 : absolute decoupling

0 < D < 2 : (relative) decoupling

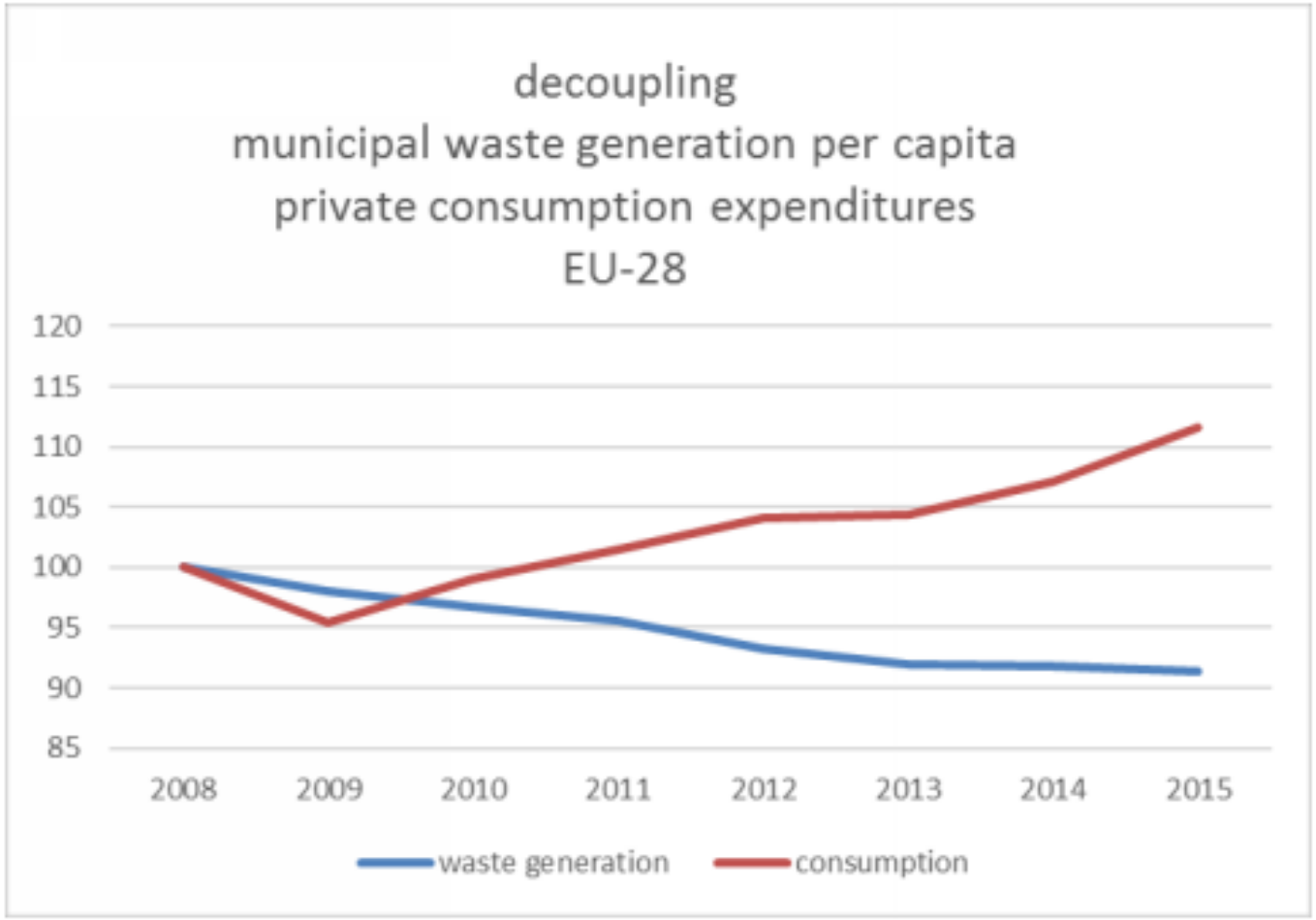
D ≈ 0 : coupling

D < 0 : reverse decoupling

A quantitative formula to compare slopes of EP and DF

leading to a ‘single figure’ harmonised decoupling indicator

Example 1



Decoupling indicator = 3,19

Absolute decoupling

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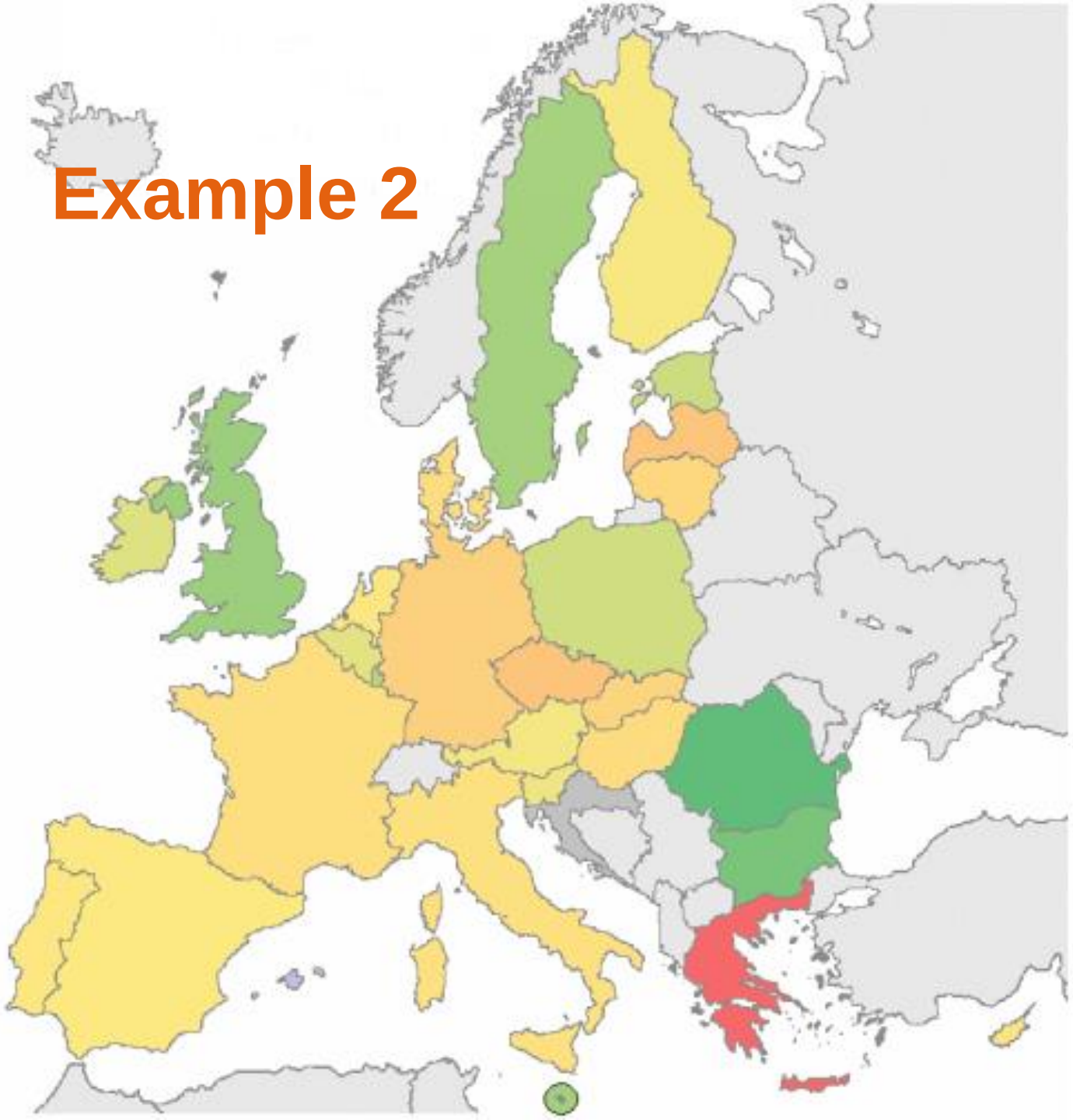
Example 2

Belgium	4,02	absolute decoupling	Lithuania	1,83	decoupling
Bulgaria	7,47	absolute decoupling	Luxembourg	5,41	absolute decoupling
Czech Republic	0,40	decoupling	Hungary	2,10	absolute decoupling
Denmark	2,17	absolute decoupling	Malta	6,17	absolute decoupling
Germany	1,23	decoupling	Netherlands	2,97	absolute decoupling
Estonia	4,84	absolute decoupling	Austria	3,49	absolute decoupling
Ireland	4,16	absolute decoupling	Poland	4,62	absolute decoupling
Greece	-6,65	reverse decoupling	Portugal	2,95	absolute decoupling
Spain	3,11	absolute decoupling	Romania	8,22	absolute decoupling
France	2,36	absolute decoupling	Slovenia	3,67	absolute decoupling
Croatia	n/a	n/a	Slovakia	1,72	decoupling
Italy	2,51	absolute decoupling	Finland	3,40	absolute decoupling
Cyprus	2,81	absolute decoupling	Sweden	6,04	absolute decoupling
Latvia	0,45	decoupling	United Kingd	6,33	absolute decoupling

Same exercise

Decoupling indicators for all Member States

Example 2



- Overall: decoupling
- More decoupling in the east than in the west:
  - Increasing consumption, but (still) less throw-away societies.
- Outlier Greece
  - Data in the midst of the Greek crisis
  - Decreasing consumption, no decreasing waste generation
- Outlier UK
  - More decoupling than other western EU countries
- Croatia: no data

Mapping decoupling

Comparing decoupling levels

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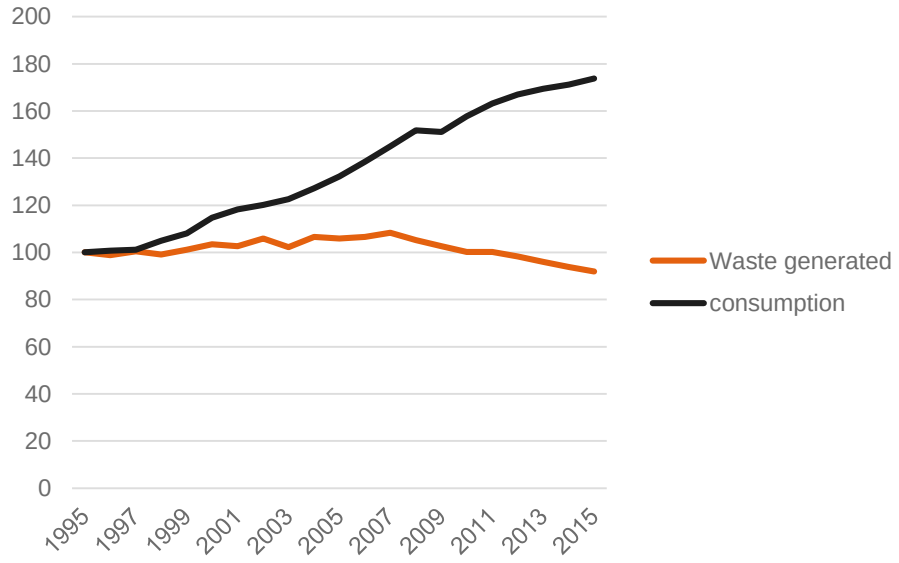
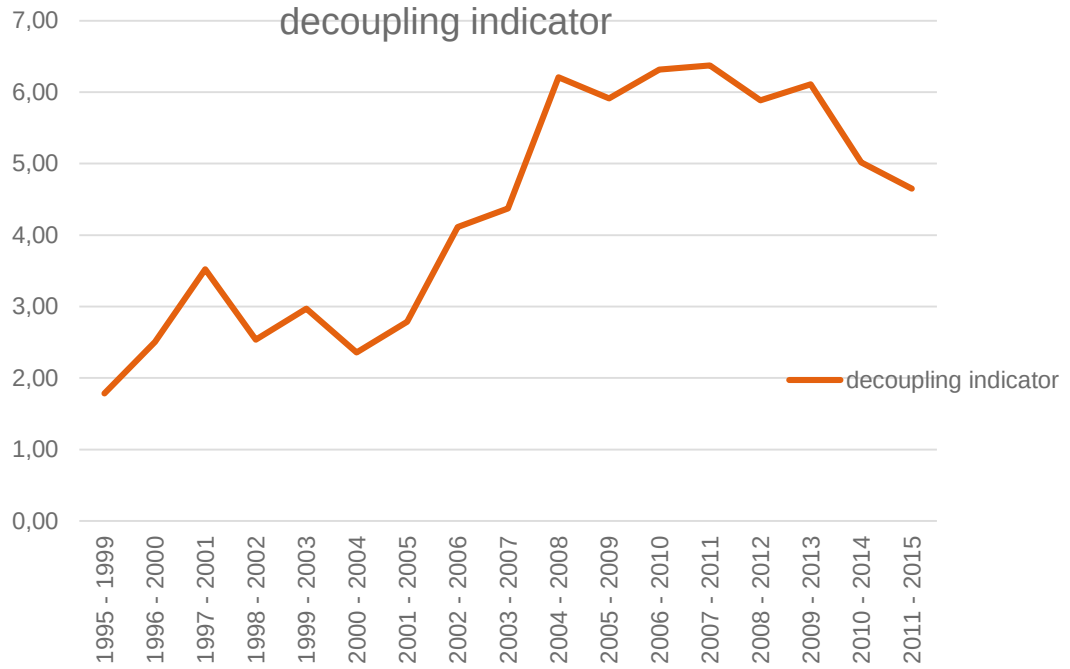
Example 3:

decoupling in Belgium between municipal waste generation per capita vs household consumption expenditure





Decoupling indicator evolution

Is there an increase in the level of decoupling?

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Conclusions

Decoupling is an important concept for actual and future policy development

Decoupling is an essential element in circular economy

Decoupling deserves a quantifiable indicator

- Objectivise
- Harmonise
- Allow comparison and benchmarking
  - With other economies
  - With other time frames

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