

Rebound effects of sustainable production

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Bo P. Weidema

2.-0 LCA consultants

Overview

- Rebound effects defined
- Examples
- Importance
- Policy implications
- Research needs

Rebound effects defined

- Rebound effects are the derived changes in production and consumption when the implementation of an improvement option liberates or binds a scarce production or consumption factor

such as:

- **money** (when the improvement is more or less costly than the current technology),
- **time** (when the improvement is more or less time consuming than the current technology)
- **space** (when the improvement takes up more or less space than the current technology), or
- **technology** (when the improvement affects the availability of specific technologies or raw materials).

Examples

- **Money:** Liberated consumer money will be used for other products - and money can only be spent once.
- Price elasticities show how liberated money are spent, or where savings are made.
- 35% own price elasticity of **meat**: If price increases by 1%, consumption of meat will decrease by 0.35% (specific price rebound); the rest of the price change will result in decreases in other products (general price rebound, on average or marginal spending).
- Ignoring price rebound effect leads to underestimating the sustainability effect of technologies that involve economic costs – and overestimating the effect of technologies that involve a cost saving.

Examples

- **Time:** Time elasticities (Coefficients of time allocation when more or less time becomes available) are scarce. Some indications that shifts mainly occur within work and leisure activities, not between them.
- Shifting in the **timing** of activities: Day-time shopping, night-time Internet shopping. More flexibility leads to more outgoing activities.
- **Space:** Liberated road space is filled 50-90% by increased traffic. Agricultural land constraints lead to pressure on nature.

Examples

- **Technology:**
 - Wider applications than foreseen
 - Reducing or increasing use of other technologies: Car ownership / car driving
 - Raw material constraints: Fish constraints lead to changes in pork consumption
- In general, ignoring rebound effects leads to either under- or over-estimation of the effects of new technologies. This stresses the need to assess new technologies from an overall cost-benefit perspective, including rebound effects.

Rebound effects of 12 improvement options for meat and dairy products in EU-27. All values in MEUR per year.

Negative values signify an improvement (= cost reduction).

ID no.	Economic impacts (costs)	Net environmental impacts	Result before rebound effects	Rebound effects	in % of result before rebounds
1	70	-140	-70	-270	390%
2	-500	-2600	-3100	-4700	150%
3	1360	-3200	-1840	-1430	78%
4	900	-3500	-2600	-1260	49%
5	-590	-1620	-2200	-115	5%
6	210	-510	-300	-220	73%
7	0	-1280	-1280	-225	18%
8	1360	-2430	-1070	-1100	102%
9	-78000	-900	-78900	-7760	10%
10	-330	-320	-650	-370	57%
11	-620	-1100	-1720	130	-7%
12	-15000	-5300	-20300	640	-3%

Policy implications

- *Impact intensity*, i.e. impact per Euro, is a relevant indicator for sustainable consumption.
- This points to a “quality strategy” for sustainable consumption.
- To put the lesson short:
 - Ensure that consumers spend money on low impact products (and restrict availability of high impact products).
 - Ensure that consumers spend time on low impact activities (and restrict availability of time for high impact activities).
 - Ensure that space is spent for low impact activities (do not expand space for high impact activities).

Research needs

- Although rebound effects may already now be quantified and applied in policy analysis, improvements in our modelling capacity is warranted:
- Better data on marginal consumption patterns, and on time and space elasticities.
- More knowledge is also required of the best ways to influence consumer behaviour, to convert the insights in the rebound effect into reductions in environmental impacts.