



AALBORG UNIVERSITY
DENMARK

Aalborg Universitet

Conceptual challenges for internalising externalities

Miguel, Brandão; Weidema, Bo Pedersen

Published in:

Proceedings of the 6th International Conference on Life Cycle Management

Publication date:

2013

Document Version

Early version, also known as pre-print

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Miguel, B., & Weidema, B. P. (2013). Conceptual challenges for internalising externalities. In Proceedings of the 6th International Conference on Life Cycle Management (pp. 205-208). Chalmers tekniska högskola.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- ? Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- ? You may not further distribute the material or use it for any profit-making activity or commercial gain
- ? You may freely distribute the URL identifying the publication in the public portal ?

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

CONCEPTUAL CHALLENGES FOR INTERNALISING EXTERNALITIES

Miguel Brandão* (*International Life Cycle Academy*), Bo P. Weidema (*Aalborg University*)

**International Life Cycle Academy, Passeig Pujades 1, 08003 Barcelona, Spain,
Miguel@ilca.es*

Keywords: external costs; monetarisation; temporal distance; compensation; temporal benefit sharing.

ABSTRACT

We analyse a number of different externalities to identify conceptual challenges for the practical implementation of their internalisation. Three issues were identified: i) The balance between compensation and technology change and the respective effects on the nominal and real GDP; ii) The relevance and efficiency of different instruments for internalisation and compensation; and iii) Implementing internalisation over large geographical and temporal distances. We find taxation to be a more relevant and efficient tool for internalisation than insurance and litigation. With increasing geographical and especially temporal distance between the benefitting actor and the victim of the external cost, the involvement of a non-governmental intermediate actor becomes increasingly necessary to provide the short-term capital required to ensure a successful implementation.

METHODS

We analyse conceptually a number of different externalities (impact categories) in order to reveal any systematic relationships between the characteristics of the externalities and the challenges facing a practical implementation of their internalisation.

The analysed externalities cover social impacts (missing education, trade barriers, labour rights violations), biophysical impacts (emissions of greenhouse gases, toxic substances and long-range pollutants), and economic impacts (free-riding on infrastructure, traffic injuries).

The externalities were classified according to their characteristics:

- The nature of the externality (e.g. economic costs, foregone income, damage to health, damage to nature),
- The relative size of costs versus benefits,
- The extent to which the externalities are already monetised (although not internalised)
- Who bears the cost or receives the benefit, and
- How these actors are placed geographically, socially, and temporally.

Based on the analysis results, we assess the applicability and adequacy of different methods for internalisation and their dependency on the above characteristics of the externalities.

RESULTS

Our conceptual analysis did not reveal any systematic differences in implementation that could be related to the nature of the externalities *per se*, i.e. whether the impacts were on economic, social or biophysical safeguard subjects.

However, three implementation issues were identified by our analysis:

- A relationship between the relative size of costs and benefits on the one hand and the relevance of compensation for the impact versus technology change to avoid the impact on the other hand, and the respective effects on the nominal and real GDP,
- A relationship between the distance of benefitting actors and victims of costs on the one hand and the relevance and efficiency of compensation via insurance and litigation versus via taxation and subsidies on the other hand, and the most efficient supply chain location for public interventions.
- The increasing difficulty of implementing internalisation with increasing geographically and especially temporally distance between benefitting actor and victim of cost.

These are explained and discussed in the following section.

DISCUSSION

The balance between compensation and technology change and the effects on GDP

In some cases, the costs of an impact clearly exceed the value of the related benefits. In such cases, it does not make sense to internalise the cost, but rather to change the technology to avoid the impact. All the analysed social impact categories (missing education, trade barriers, labour rights violations) fall in this category. Missing education implies lost productivity in the future and trade barriers imply lost productivity both now and in the future. Labour rights violations imply losses in income and well-being for the workers. The benefits are largely cost savings for specific current actors. If the costs (i.e. the lost productivity, income, etc.) were to be internalised, the reason for creating the impact in the first place would disappear, i.e. there would be no advantage not to provide adequate (economically-optimal) education, to maintain trade barriers, nor to violate worker's rights.

In the opposite situation, where the benefits of the activity clearly exceed the costs, it makes sense to continue the activity even after internalisation of the costs. Examples can be found where the elasticity of demand is low, i.e. not sensitive to price changes, as for example private car usage (Goodwin et al. 2004, Graham & Glaister 2004). Thus, private car usage is likely to continue largely unchanged, even if the costs of traffic injuries were completely internalised (today these costs are already partly internalised, and even compensated, through insurance payments).

Between these two extremes we have the situations where internalising the costs will reduce the competitiveness of the activity, but not to an extent where it would cease to exist. Some users would be willing to pay the increased price, while at the same time we would see some users shift to other technologies, including changes in behaviour, and a stimulation of innovation.

We can illustrate these differences by the effect they have on the nominal and the real GDP.

Without any changes in technologies and demand, the internalisation of a cost, which was previously not paid for, will initially lead to an increase in the nominal GDP, while the real GDP does not change (since there was no change in technologies and demand and thus in activities). For externalities that are already monetised, i.e. where the costs are already paid for by another actor, internalisation would initially not even have an effect on the nominal GDP, since this would simply be a re-distribution of the existing costs. An example of the latter would be the introduction of road pricing to internalise the free-riding.

Secondly, the increased cost reduces the competitiveness of the technology and when there are attractive alternatives this would lead to a shift to these alternatives and thus an overall reduction in the internalised cost. This counteracts to some extent the increase in the nominal GDP while the real GDP now increases, due to the economy becoming more efficient.

Thus, the internalisation of a cost practically always leads to an increase of the GDP, initially because the cost previously non-monetised is now monetised and therefore becomes part of the GDP, and subsequently depending on the degree of improved economic efficiency resulting from the internalisation. This runs counter to the popular idea that a reduction in real GDP should be a desirable goal.

The relevance and efficiency of different instruments for internalisation and compensation

The relevant instruments for internalisation depend on the distance between the benefitting actors and the victims of external costs. For example, the relationship between the benefitting actor of road transport and the victims of traffic injuries is very close (too close you may say), while the distance between the emitting activity of long-range pollutants and their impacts on human health, agricultural yields and the natural environment is very large. In the case of traffic injuries, it is possible to internalise the cost via an insurance payment that covers the cost of compensating the victims, and the victims can obtain the compensation via litigation. Insurance and litigation may also be an option for the impacts from specific, low-mobility toxic substances, while the distance between the cause and the damage becomes too large for long-range pollutants to make insurance and litigation a realistic option. This becomes even more obvious for impacts that take place far into the future, such as those from emissions of greenhouse gases). It can be argued that even in the case of traffic injuries, the currently partly implemented internalisation and compensation involves too high transaction costs (mainly for the litigation) compared to a system of differentiated taxation on road traffic and a public payment for treatment, lost income and compensations for mortality and morbidity. With larger distance between benefitting actor and the victims of the cost, transaction costs would increase and the taxation option becomes even more obvious as the most efficient solution, both with and without subsequent compensation of the specific victims.

A second issue here is where in the supply chain such taxation is most efficiently implemented. While it is obvious that a tax or quota on the actual cause for the externality will lead to the least confounding or secondary distortions, there are cases where the transaction costs of such a direct implementation may be unreasonably high and it becomes relevant to look for another place in the supply chain where there are fewer flows or activities to be taxed. For example, the administration of a direct SO₂ or GHG emission tax will be more costly than a tax on the sulphur or carbon content of raw materials at their extraction.

Implementing internalisation over large geographical and temporal distances

With increasing geographical and especially temporal distance between the benefitting actor and the victim of the cost, the implementation of internalisation becomes more difficult, because the options for the victims to participate and exert pressure on the political process is limited or absent, while those currently benefiting from non-internalisation are both likely and able to provide opposition. A solution that can be seen as acceptable both to the current benefitting parties (who stand to lose from internalisation) and to the distant victims, could be one in which the benefit of internalisation is shared with the present-day losers of internalisation, so that their loss of benefits is at least partly compensated. Although it may seem unfair to take from the victims and give to those causing the impact, the alternative of non-internalisation would be even more unfair. The compensation of the present-day losers from internalising externalities needs of course to be phased out over a period, if the end-result is to be a full realisation of the efficiency gains from the internalisation.

A particular complication occurs when the impact, and thus the benefit of internalisation, lies in the future, while the cost of internalisation is immediate. The suggested compensation of the present-day losers (of internalisation) requires a transfer of future benefit to the current actors. Such long-term transfers can be difficult for governments that generally have a short-term policy horizon, due to the general opposition to taxation. A solution that avoids the need for increasing taxes in the short term would be to employ an intermediate actor that is able to provide the capital to compensate the present-day losers while recuperating this expenditure from the future benefits. The government would not need to provide payment instantly but simply would provide a guarantee of future payment based on the real increase in future tax revenue caused by the internalisation.

Among the analysed externalities several suffer from the distance problem and thus may require such interventions. Both greenhouse gas emissions and missing education are particularly subject to the temporal distance issue while trade barriers also have an aspect of geographical distance and labour rights violations also have an aspect of social distance. The proposed mechanism for temporal benefit sharing can also be extended to the geographical and social distance issues.

CONCLUSIONS

We identified and addressed several conceptual challenges for internalizing externalities. Specifically, we identified the distance between the benefitting actor and the victim of the cost as having a decisive influence on the instruments necessary for a successful implementation. A strong government role is required to ensure the functioning of the necessary transfers of benefits.

REFERENCES

- Goodwin, P.B, Dargay, D and Hanly, M (2004): Elasticities of road traffic and fuel consumption with respect to price and income: A review. *Transport Reviews* 24(3):275-292.
- Graham, D.J and Glaister, S (2004): Road traffic demand elasticities: A review. *Transport Reviews* 24(3):261-274.