1. Introduction

Globalization in general and European integration in particular have created an economy based on the free movement of people, goods and services. Due to its high quality door-to-door service road transport plays a crucial role in this process. It has become an integral part of any logistics system and thus a vital production tool. But the use of roads does not only contribute to economic growth and prosperity, it also has negative side effects such as noise, the emission of pollutants, and environmental damage. These side effects are labeled ‘external effects’ (‘externalities’) and the costs associated with them – for example, costs of congestion, accidents, air pollution, noise and environmental damage – are called ‘external costs’. According to a generally held view, such external effects can lead markets to allocate resources inefficiently if they are not properly reflected in the market price of an activity, resulting in a problem usually named market failure. In order to get the prices right, that is to reflect the full social costs of an activity, external effects and the external costs associated with them should be internalized. In very general terms, internalization can be described as an intervention that leads a decision maker to face the full social costs, including both their private costs and the external costs of their actions. This means that costs that would otherwise be ‘external’ are taken into account by the decision maker and influence their decisions.

There are different ways in which internalization can be achieved: whereas command-and-control policies regulate behavior directly, market-based policies rely on the price mechanism, for example, by imposing Pigovian taxes or charges. Both types of policies are usually based on the same assumptions: the emitter of pollutions causes the external effect and so they should bear its costs. This rationale has a very popular name: the Polluter Pays Principle (PPP).

The present book proposes a paradigm shift for dealing with these so-called ‘external costs’ in transport. Crucial to the analysis is the insight that external costs are not caused by the polluter alone but are the result of conflicting uses of scarce resources which include the environment. Consequently, polluters are not the only ones who ‘cause’ external costs; pollutees and the State are cost drivers as well and a priori there is no reason to exempt them from having to contribute to the reduction of external costs. It will be shown that applying the Cheapest Cost Avoider Principle (CCAP) instead of the PPP can lead to substantial welfare improvements.
1.1 CONTROLLING POLLUTION

To understand what the CCAP means and why it is superior to the PPP it is essential to understand the fundamentals of external costs.

In very general terms, externalities are effects of a consumption or production decision made by one agent on the consumption set, utility function or production function of other economic agents which do not work through the price system. Externalities may be positive or negative, that is, they may generate a benefit for or impose a cost on other agents, which is (by their definition) not taken into account by the decision maker. External costs can then be defined as the utility loss (expressed in monetary terms) or the increase in production costs suffered by those other agents affected by the decision. In contrast, private costs are the costs faced by the decision maker. Social costs comprise both private and external costs.

A number of implications follows from this. First, external costs do not exist in a void, but are derived from utility losses or higher production costs of economic agents. For example, effluents pumped into a river are not in themselves an external effect, and do not automatically cause external costs. The increase in production costs of a downstream plant that has to clean up the water before it can be used in its manufacturing process, in contrast, is an external cost, as are the utility losses suffered by those who are (or would be) using the river banks for their recreation.

Second, external effects, and thus external costs, arise only when there are competing uses of scarce resources. Without a downstream factory using the water in its manufacturing process, or swimmers and sunbathers using the river as a leisure facility, there would not be an external effect, and there would not be any external costs.

Third, the fact that there are competing uses of scarce resources also means that reducing the harm to one party inevitably implies harming the other party. Reducing the costs faced by the downstream plant for cleaning river water by reducing the amount of wastewater pumped into the river upstream means imposing costs on the upstream firm, which will have to find other ways of disposing of wastewater, treat the water, or move elsewhere. In other words, externality problems are always of a reciprocal nature: reducing the costs imposed on one party imposes costs on the other. External costs depend on the actions of all of the parties involved – the decision maker as well as those affected by the decision. For example, the extent to which using the river as a deposit of wastewater causes external costs is likely to depend on the production technology chosen by the downstream firm, which in turn affects how much cleaning is required. The utility loss suffered by swimmers and sunbathers might be avoided if they chose a spot upstream, although in this case they would experience higher travel costs.
The last two points are of particular importance, as they highlight that the question of how one should most appropriately deal with external effects is more complex than simply asking how much the party ‘causing’ the external effect should be paying (and on what particular variables the amount payable should depend). It may be efficient to charge the upstream polluter for pumping waste-water into the river, but not necessarily so. Welfare may be higher if the downstream firm were left to face the cost of cleaning the water that it requires for its production if it can do so at lower costs. Or efficiency may require that both parties pay – the upstream polluter some internalization charge, and the downstream firm some cost of cleaning up the water. Which of these options should be chosen depends on the costs and the effectiveness with which the various parties can reduce the externality.

One can distinguish two approaches to the treatment of the external costs. According to the traditional view, sometimes called Pigovian, external costs should be internalized as prescribed by the PPP. The PPP (European Commission, 1999, p. 5; OECD, 1975) mandates the internalization of external costs by requiring that those who ‘cause’ external effects bear the costs of avoiding such effects or compensating those who are affected for the damage suffered. The government can accomplish this in one of two ways. It can impose a so-called ‘Pigovian tax’ on the polluter in order to provide the necessary incentives for the latter to internalize the externality. Alternatively, the government can follow a command-and-control approach and restrict activity levels (for example, through speed limits, or prohibiting certain types of vehicles at specific times from using the road in order to internalize the external costs of road transport) or prescribe the installation of avoidance and abatement devices or alterations in the mode of operation so that external costs are prevented in the first place. In an ideal setting internalization restores the Pareto optimality of competitive equilibria. Pareto optimality requires that no actor can be made better off without making someone else worse off. This implies that there is no waste of resources and that the welfare of society is at its maximum.

By contrast, the modern view, originating from Noble prize winner Ronald Coase, suggests the application of the CCAP.2 The CCAP requires that the party which can prevent the damage at the lowest costs should take action provided that the preventive measures cost less than their benefit in terms of the damage they avoid. The CCAP also requires undertaking some form of cost-benefit analysis in order to identify the cheapest cost avoider as well as the measures the latter should apply in order to maximize the welfare of society (Calabresi and Hirschoff, 1972, p. 1060; Coase, 1960; Demsetz, 1972, p. 28). According to this principle, any preventive measures that cost less than the benefit they produce should be undertaken, whether by the polluter or by the pollutee or the government. Means to achieve maximal welfare can be financial charges, taxes, fines, liability or even command-and-control measures,
such as regulated standards or zoning, as well as investment in infrastructure by the government.

Both principles differ with respect to how the problem is defined, as well as in relation to how measures to solve it are identified and selected.

In the traditional view the problem that has to be addressed is formulated in terms of a market failure arising from a negative external effect. The fact that this effect is not priced implies that the party ‘causing’ it has no incentive to take it into consideration. Consequently, the price system fails to allocate resources efficiently. For instance, the impact of transport on the environment is not reflected in the pricing of transport, inducing transport activities whose social value is below their true social costs (comprising both private and external costs). It is important to note that according to the Pigovian view there is only one agent who causes the external cost – the provider of transport services. The solution of the problem consists of confronting this agent with the external cost they ‘cause’, usually called internalization.

As for the identification of measures suited for internalizing the external costs to the transport services two options exist:

- the transport services reduce the harm ‘caused’ by their activities; or
- they pay for the harm by way of taxes or compensation of the victims.

The final decision consists of the selection of a measure (or a set of measures) which is judged to internalize the external effects most cheaply.

The modern view formulates the problem as a conflict in resource uses between those who seek to use the environment for the provision of transport services and those who seek to use it for residential, recreational, aesthetic or other productive purposes. The problem to be solved by policy makers is not a problem of the internalization of external costs but of how optimally to reduce the conflict over the use of the resource.

Three general options are identified:

- transport services reduce environmental harm imposed on others, pay taxes or compensate ‘victims’;
- other users of the environment reduce the harm suffered or pay transport services to reduce it;
- the government invests in infrastructure to avoid the occurrence of harm.

The final decision consists of choosing the option or the set of options which are seen to resolve the conflict of uses at the lowest costs.

From a Coasian perspective the terms ‘externality’ and ‘external costs’ are therefore misleading. Of course, these terms make perfect sense in a theory in
the tradition of Pigou, but if ‘externalities’ are considered to be the result of competing uses of a scarce resource and to be jointly caused, matters look different. In fact, Coase never used the word ‘externality’ in his 1960 article ‘The problem of social cost’ but spoke of “‘harmful effects” without specifying whether decision-makers took them into account or not’ (Coase, 1988, p. 27). In his words: ‘Indeed, one of my aims in that article was to show that such “harmful effects” could be treated like any other factor of production, that it was sometimes desirable to eliminate them and sometimes not, and that it was unnecessary to use a concept such as “externality” in the analysis in order to obtain the correct result’ (ibid.). In this book we cannot avoid the usage of the terms externality and external costs, since they are standard in the Pigovian treatment of the issue and since no other expression exists or is used in economics in order to describe the problem similarly intuitively. But it should be borne in mind that we use these terms with the qualifications mentioned above. Some qualifications are also necessary as for the usage of the terms ‘victim’ or ‘offender’. If harm is jointly caused, there are no ‘victims’ or ‘offenders’: ‘everybody involved is fully responsible for all the damage done’ (de Meza, 1998, p. 273). Even the terms ‘polluter’ and ‘pollutee’ are misleading in this respect. Still, in this book we will use these terms wherever necessary to distinguish the parties involved.

1.2 PARADIGM SHIFT

Based on a theoretical examination of the relative strengths and weaknesses of the PPP and the CCAP this book proposes a paradigm shift for dealing with external costs in transport. The PPP, as it is widely interpreted and put into practice, turns out to be inferior to the CCAP both in terms of efficiency and factors beyond efficiency such as, for example, equity. If everybody involved is fully responsible for all the damage done, it is impossible to assign single responsibility for such damage and the Pigovian scheme must fail (ibid.). To be sure, as Baumol reminds us, ‘taken on its own grounds’ the conclusions of the Pigovian tradition to which the PPP belongs are impeccable (Baumol, 1972, p. 307), which means that taxation proposals derived from the PPP would lead to an optimal allocation of resources. However, Baumol also points out: ‘All in all, we are left with little reason for confidence in the applicability of the Pigovian approach literally interpreted. We do not know how to calculate the required taxes or subsidies and we do not know how to approximate them by trial and error’ (ibid., p. 318). Since such tax proposals are – as Coase put it – ‘the stuff that dreams are made of’ (Coase, 1988, p. 185), carrying them out means heading towards regulatory failure. For example, the mere existence of externalities does not, in itself, provide any reason for governments to induce polluters to
take action. Indeed, if the polluters are the highest cost avoiders, the intended internalization of external costs is not desirable because it does not increase (let alone maximize) social welfare. Moreover, the PPP does not take into account the fact that externalities are caused jointly, and that the externality problem is of a reciprocal nature: to avoid harm to a pollutee would inflict harm on the polluter. The real problem is to minimize the inevitable harm.³

A regulatory policy that aims at the maximization of society’s welfare requires a careful and comprehensive analysis and assessment of likely economic, social and environmental impacts, both direct and indirect, of all available regulatory measures. In part inspired by the US model that requires a full-fledged cost-benefit analysis to be undertaken in preparing major regulatory proposals (European Commission, 2001, 2005; Ogus, 2006, p. 282), public sector bodies in Europe have to prepare what has become known as a ‘regulatory impact analysis’, a ‘regulatory impact appraisal’ or a ‘regulatory impact assessment’ which includes some form of cost-benefit analysis (Ogus, 2006, p. 279).⁴

Cost-benefit analysis in its strict form is a procedure for comparing the aggregate (social) gains and losses that can be expected to arise from the implementation of a regulatory proposal. Maximizing the welfare of a society (which is derived from the welfare of its members) requires a comparison of the costs and benefits of different regulatory options, and the choice of the option which promises the highest net benefit to society. Such a cost-benefit analysis is concerned both with the determination of the optimal goal of a regulatory proposal and with the means of realizing it at the lowest cost.

Some methods of regulatory impact assessment apply what one might call a ‘weaker’ form of cost-benefit analysis, namely the so-called cost-effectiveness analysis. Cost-effectiveness analysis has two principal functions: to determine how to maximize the benefits for a given level of costs or to determine what regulatory intervention will generate specified benefits at lowest cost. Compared to the cost-benefit analysis in the strict sense, a cost-effectiveness analysis is a less ambitious mode of economic appraisal since it does not address the problem of specifying the optimal level of an economic policy goal, such as the optimal reduction of pollution. However, both the cost-benefit analysis in the strict sense and the cost-effectiveness analysis generally require the identification of the cheapest cost avoider.

We strongly support a position taken by the OECD when deliberating policy measures:

Any individual policy instrument should only be introduced if there is a reasonable expectation that this instrument will add to the total welfare of society. The same is true for combinations of policy instruments. In practical terms for the environmental policy domain, this means that: i) the marginal cost of implementing a given instrument mix should be less than its marginal benefit (‘cost-benefit’ criterion); ii) the marginal cost of applying a given instrument mix should be as low as possible (‘cost-
effectiveness’ criterion); and iii) the marginal environmental benefit associated with a given instrument mix should be as high as possible (‘environmental effectiveness’ criterion). (OECD, 2007, p. 20)

The PPP bypasses such a cost-benefit analysis of all available measures because the decision of who should pay is automatically taken rather than based on a consideration of any of the above criteria. In contrast, the CCAP requires policy makers to conduct a cost-benefit analysis of alternative uses of the scarce resource and of corresponding abatement costs by all actors. Consequently, the party or parties who can prevent a harm at the lowest cost overall should take action.

The CCAP presents a number of clear-cut advantages over the PPP (see Chapters 2 to 6):

- The CCAP is clearly more sophisticated than the PPP (which it encompasses as one special case) in terms of efficiency, and it is also superior when taking into account values such as corrective justice, distributive justice, undamaged environment or the interests of future generations.
- Its use of some form of cost-benefit analysis in a welfare economics framework implies that it takes into account a much broader range of relevant variables, such as administration costs or social values beyond efficiency.
- The logic of the CCAP helps in avoiding regulatory failure and is well in line with the principles of regulatory impact assessment.

1.3 CASE STUDIES

To show that the CCAP can be, is, and must be applied, we illustrate the methodology with two exemplary cases:

- the question of the construction of the missing part of the A44 highway near Kassel in Germany; and
- the problem of the ban on trucks from certain sectors carrying goods using parts of the Inn Valley highway in Austria.

Making heavy goods vehicles (HGVs) drive a detour (as in the A44 case) and banning certain types of trucks from using the Inn Valley highway can be interpreted as regulatory measures flowing from the idea of the PPP.

In the first case study plans exist for the highway A44 connecting Dortmund to Kassel to be extended in the direction Erfurt, Chemnitz and Dresden via Eisenach. However, except for a small section, these plans have never been realized. Instead, there is a direct road B7 between Kassel and Eisenach along the
route of the planned highway. This road is closed to trucks, who are obliged to
drive a detour of 42 kilometers via the highways A7 and A4. This detour gener-
ates both extra private and external (pollution) costs of 34 to 590 million euros
per year.

The cheapest cost avoider analysis of the A44 case involves the cost-benefit
analysis of two scenarios: Scenario 1 considers the question of whether the
interests of society would be better served by building the A44 compared to
requiring HGVs to take the detour. Scenario 2 addresses the question of whether
the interests of society would be better served by lifting the ban on HGVs using
the B7 compared to requiring them to take the detour.

The second case study concerns the closure of 46 kilometers of the Inn Valley
highway for trucks transporting goods from a number of sectors. The sectoral
ban on the Inn Valley highway is estimated to cost Germany, for example, ap-
proximately 250 million euros, plus the loss of 2500 jobs due to insolvencies,
increases in costs and a reduction in demand.

The cheapest cost avoider analysis suggests that it would be beneficial to
build the A44 and to lift the ban on the Inn Valley highway because both the
detour and the ban are inefficient. Legal reasoning by the local court in the A44
case and by the European Court of Justice in the Inn Valley case implicitly ap-
plies the cheapest cost avoider approach.

1.4 THE INTERNALIZATION OF EXTERNAL COSTS IN
EUROPEAN TRANSPORT

amending Directive 1999/62/EC on the charging of heavy goods vehicles for
the use of certain infrastructures, a ‘fair’ system of charges is based on the ‘user
pays’ principle and the application of the ‘polluter pays’ principle (European
Commission, 2006, recital 2). The directive specifically mentions ‘the polluters
[sic] pays principle for all modes of transport, by means of the internalisation
[sic] of external costs’ (ibid., recital 18, recital 19).

The 2006 directive requires the Commission to provide a model for the as-
sessment of all external costs of road transport, which are to be internalized in
the form of infrastructure charges. In July 2008 the Commission presented the
proposal required by the 2006 directive, stating that the optimization of the
transport system ‘calls for a further recourse to the “user pays” principle and
the development of the “polluter pays” principle in the transport sector’ (Euro-
pean Commission, 2008b, recital 3).

The last chapter of this book offers a critical assessment of the economic logic
underpinning the Commission’s proposal. Its narrow focus on the PPP is identi-
fied as a fundamental methodological flaw. Moreover, given that the need for a
careful assessment of costs and benefits associated with any policy intervention is a well-established principle of community policy (see the European Commission’s White Paper of European Governance of 2001 and the Commission’s Impact Assessment Guidelines of June 2005) one would expect that such assessment be undertaken. But the Commission’s proposal (European Commission, 2008b) as well as the staff working document accompanying it (European Commission, 2008c) fails to do so. Both endorse a simplistic view of external costs as being caused by one particular party – the polluter – and ignore the more sophisticated understanding of external costs as arising from competing demands of various actors for scarce resources. Both documents neglect the basic insight that external costs are caused jointly by all the parties competing for scarce resources and that the problem is therefore of a reciprocal nature: avoiding pollution and thus improving the pollutee’s situation will inflict harm on the polluter. The logic underpinning the PPP obscures the nature of the choice that has to be made. In the staff working paper accompanying the Commission’s July 2008 proposal the Commission explicitly refers to the CCAP but rejects it and defends its choice of the polluter pays approach (ibid., p. 38). We will show that the rejection of the CCAP is, to the best of our knowledge and admitting that this is an economists’ point of view rather than a lawyers’, not required by legal rules and follows from some conceptual misunderstandings. Our aim in the last part of this study is to show that if it takes its Better Regulation Agenda seriously the European Commission cannot but abandon the PPP and must apply the CCAP.

1.5 MAIN FINDINGS

The main results of our book can be summarized as follows:

1. It is not necessarily only the transport industry (that is, the polluter) that is responsible for externalities. Other actors, such as the state or the pollutee, may also be in a position to take measures to reduce externalities, and sometimes they should do so in the interest of economic efficiency and fairness.

2. Not all harm caused should automatically be internalized. Internalizing too much of the damage arising from external effects would cost society more than it would benefit. A certain level of damage may have to be accepted in order to achieve efficiency.

3. The type of measure taken to make the transport industry pay must be based on a broad impact analysis. For example, a kilometer toll would not sufficiently reduce the harm caused by pollution if trucks employ an alternative route which, albeit shorter, involves the same (or even a higher) level of emissions.
4. The PPP as it is commonly understood and put into practice should not be used for policy design because it neglects the basic insight that external costs are caused jointly by all parties involved and that the problem of externalities is of a reciprocal nature.

5. The CCAP should clearly be used in policy design in general, and for transport policy in particular, because it guarantees efficiency and fair competition. It is based on some form of cost-benefit analysis (which is also part of a regulatory impact assessment), it is a better means to achieve fairness, and it finally leads to better incentives for all parties involved. Ignoring the CCAP is likely to result in regulatory failure.

6. The cheapest cost avoider analysis incorporates ‘polluter pays’ as one possible outcome. However, in contrast to the simplistic interpretation of PPP, this is not a foregone conclusion.

7. The CCAP is partly already used, especially by courts which are generally involved in resolving conflicts of interests. Regulatory bodies with a mandate for road transport should follow the same principles.

8. Proposals for the internalization of external costs in the European Union are guided by the PPP. Thus, these policies risk the danger of regulatory failure.

9. The duty to perform impact assessments as set out in the European Commission’s Better Regulation Agenda is to be highly welcomed. However, the Commission should not stop halfway. It should try to live up to the requirements posed in its Impact Assessment Guidelines. Thereby, the likelihood of regulatory failure can be minimized.

The remainder of this book is organized as follows. Chapter 2 describes the building blocks of the Pigovian tradition: market failure, externalities and their internalization by imposing a tax on the polluter. Chapter 3 deals with the Coasian revolution and outlines the fundamentals of the Coasian paradigm. Chapter 4 delivers a comparison of the Coasian and Pigovian way of economic thinking and offers a critical assessment of the Pigovian tradition. Chapter 5 focuses on the working properties of the CCAP and analyses mechanisms to implement it. Chapter 6 turns to questions beyond efficiency such as, for example, fairness issues and provides an examination of the relative strengths and weaknesses of the PPP and the CCAP. Chapter 7 demonstrates how the CCAP can be applied in practice by providing two case studies. Chapter 8 delivers a critical assessment of the European greening transport policy and shows that the rejection of the CCAP by the European Commission is based on conceptual misunderstandings. Chapter 9 concludes.

We focus our analysis on road transport, though we note that the principles presented in this book apply more widely, and should be used in all cases where regulatory intervention is aimed at addressing a problem of external effects.
NOTES

1. Strictly speaking, we deal with so-called ‘technological’ externalities as opposed to ‘pecuniary’ externalities, which do work through the price system. For example, an increase in demand for a particular product by an economic agent may cause the market price for that product to increase, which obviously affects other buyers who now face higher prices. However, such pecuniary externalities are not Pareto relevant, that is, they do not affect the Pareto optimality of competitive equilibria provided that all assumptions underpinning the first fundamental theorem of welfare economics hold and thus prices only have the effect of equating supply and demand. For a definition and discussion of externalities, see Laffont (1987).

2. The term ‘cheapest cost avoider’ was proposed by Calabresi in 1970, taking up ideas from Coase (1960) and Demsetz (1967); see also Calabresi and Hirschoff (1972).

3. As Donald Wittman aptly puts it, ‘[u]ntil Coase, people talked about a driver causing harm to a pedestrian or factory smoke damaging laundry hung out to dry. After Coase’s article, people realized that cause is an outmoded concept. Rather, the appropriate insight is to see that there are several inputs into the production of damage. In the automobile accident case, the care by the driver and choice by the pedestrian are both inputs into the accident. The question becomes, which combination of inputs is optimal? This, of course, depends on the marginal productivity of the input in reducing expected damage and the marginal cost of the input’ (Wittman, 2006, p. 54).

4. The UK is a good example. To quote Ogus: ‘The current UK regime requires a regulatory impact assessment (RIA) to be undertaken by government departments making any proposal for regulation which has “an impact on business, charities or the voluntary sector”. The document must include an identification of, *inter alia*, the risks that the proposal is addressing and an attempt to quantify them; the different regulatory options for meeting them; the benefits and costs of these options and the sectors which will bear them; “equity and fairness issues”; and any distributional impacts of the proposals. It should conclude with a recommendation regarding the preferred option, giving reasons based on the elements of the assessment, “in particular the analysis of the benefit and costs”’ (Ogus, 2006, p. 283).

5. A policy guided by the CCAP meets fundamental recommendations regarding assessments of policy targets and instruments, as, for instance, put forward by the OECD: ‘First and foremost, policy makers should consider carefully whether the additional benefits of further environmental improvements and the additional costs to society of achieving these improvements balance reasonably well. This implies the need to assess the targets set for environmental policy.

If the sum of all the benefits of additional improvements can be expected to exceed the related costs, the improvements ought to be pursued. If the costs clearly outweigh the sum of all relevant benefits – even if the most efficient policy instruments were to be applied in order to reach the targets – a reconsideration of present priorities would be appropriate.

Policy-makers should also make an in-depth ex ante assessment of any new instrument being considered for implementation – to assess what each instrument would contribute as regards environmental effectiveness and economic efficiency. They should also regularly undertake carefully ex post reviews of the instruments they apply to achieve a given target – and eliminate or modify redundant instruments, that is, to reduce administration costs’ (OECD, 2007, p. 219).