Dazzled by Fireworks – Coase's Contribution on Environmental Use Conflicts

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Abstract

The contributions of the economist Ronald Coase (1959, 1960) have radically changed the analysis and rectification of environmental problems. A subtly differentiated notion of property and the recognition of the double-sided nature of environmental conflicts enabled him to develop a new economic view on environmental problems. Property rights will be exchanged – provided that transaction costs make this possible. His insights led to several new fields of research, though misunderstandings about the Coase Theorem are still prevalent today. Forest economics research has followed more strongly the Coasean way of thinking in recent years; however, the potential is not yet exhausted by a long way.

Keywords: Coase Theorem, consent, exchange, institution, Pigou tax, transaction costs, property rights, scarcity

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Ronald Coase¹ gave economists and lawyers a new lens through which they could see transaction costs and property rights more clearly. In doing so, he changed and fertilized both economics and law. Ronald Coase was awarded the Nobel Prize in Economic Sciences in 1991 for his findings. Coase received recognition comparatively late, as on the surface his view of things bordered on heresy for welfare economics and perversion for jurisprudence (Medema & Zerbe 2000).

Based on his reflections on the existence of companies, which Coase already made at the age of 22, at the age of 50 he investigated the great power of the Federal Communications Commission and its policy on the allocation of radio, television and wireless frequencies. After publishing his findings (Coase 1959), he was asked by 20 professors at the University of Chicago to explain his obviously incorrect view of «externalities» (Kitch 1983). He succeeded in convincing Milton Friedman, George Stigler and other market protagonists, who initially vehemently defended Arthur Pigou and his welfare economics. Subsequently, Coase (1960) wrote down his thoughts once again and called the essay «The Problem of Social Cost» (PSC). It hardly contains any ideas that are not already more or less explicitly contained in the essay on the Federal Communications Commission. However, it takes account of the debate in Chicago insofar as it sets a differ-

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¹ For a short, up-to-date biography see Medema (2008), for an overview and evaluation of the content see Pies (2000).

ent focus and reinforces the criticism of Pigouvian thinking. PSC becomes one of the most cited economic essays.

Ronald Coase lit up the night with fireworks in 1959 and 1960 because PSC contains at least six discoveries. It can be assumed that most readers never studied PSC to the end - and therefore missed the right trail in the night, blinded by the fireworks. This may be lamented, as Coase would otherwise have gained recognition sooner. However, scientific revolutions hardly happen overnight. In Coase's case, this is shown by the fact that PSC, although published 50 years ago, has by no means become «normal science» (Kuhn 1962) and is only tentatively finding its way into textbooks.

The following article² first explains Coase's astonishing views and illustrates them with a fictitious example. It then traces the peculiar history of the reception of PSC. On the basis of James Buchanan's criticism, Coase is then placed in the tension field between the allocation and coordination paradigms. The article concludes with references to forest economics. It mostly refers to PSC, although the 1959 essay goes into more detail on the importance of property rights for the market process.

The fireworks in six pictures

Only property rights count

Coase breaks away from conventional ideas about property. Instead of the previous concept of property, he consistently thinks in terms of property rights. This enables him to perceive and analyze property in a much more differentiated way.

Thus, whether we have the right to shoot over another man's land has been thought of as depending on who owns the airspace over the land. It would be simpler to discuss what we should be allowed to do with a gun. (Coase 1959: 34).

The easiest way to illustrate this concept of ownership is to use bundles of property rights. In Switzerland, a large number of property rights belong to each forest parcel, although only some of them belong to the forest owner. For example, certain property rights belong to the Canton (e.g. hunting rights) and others to the Confederation (e.g. clearing and conversion rights). If the individual rights are now represented as sticks, the persons and institutions listed each have a bundle of property rights (Figure 1). It is obvious that these bundles of property rights can also be reconfigured by changing the owner or bundle of a single property right («stick»).

Property rights over natural resources are grouped according to access, use, management, exclusion and transfer (Ostrom 2000). At first glance, countless property rights can be identified for a forest parcel. From the right to roam, mushroom picking to the use of timber, such a differentiated concept of ownership can ultimately also cover every tree leaf and every earthworm living on the plot individually. Highly differentiated property rights are also the most important key to a new understanding of harmful effects («negative externalities»), because they make it possible to include them in human calculations using the opportunity cost approach.

A final reason for the failure to develop a theory adequate to handle the problem of harmful effects stems from a faulty concept of a factor of production. This is usually thought of as a physical entity which

the businessman acquires and uses [...] instead of as a right to perform certain (physical) actions. [...] If factors of production are thought of as rights, it becomes easier to understand that the right to do something which has a harmful effect (such as the creation of smoke, noise, smells, etc.) is also a factor of production. (Coase 1960: 43–44)



Figur 1: Forest ownership, shown as property rights bundled by owner.

Picture: Silvan Hostettler

Environmental problems are environmental use conflicts

Traditionally, environmental problems such as noise and pollutant emissions are analyzed in terms of polluter versus victim. For Coase, the polluter pays principle has no substance. He rejects it and states:

The traditional approach has tended to obscure the nature of the choice that has to be made. The question is commonly thought of as one in which A inflicts harm on B and what has to be decided is: how should we restrain A? But this is wrong. We are dealing with a problem of a reciprocal nature. To avoid the harm to B would inflict harm on A. The real question that has to be decided is: should A be allowed to harm B or should B be allowed to harm A? (Coase 1960: 2)

The reciprocal nature of adverse effects – emitter and receiver – has two consequences. Firstly, harmful effects can only occur if a person is actually affected by them (Figure 2). Smoking my Havana alone in the forest is not an environmental problem. However, smoking it in a train carriage full of non-smokers is a problem. Secondly, the reciprocal nature of the environmental problem indicates that it is obviously a conflict between me and my fellow human beings (Figure 2). I impregnate the air with smoke, my fellow travelers want smoke-free air. Obviously, clean air is scarce, but who really has the property right to clean air in the train carriage? Me or the non-smokers? This view can also be adopted for all environmental use conflicts that do not superficially correspond to the «emitter – receiver» scheme. Most economists always attribute environmental damage, such as the destruction of a tropical forest, to a conflict of use between people. Environmental issues such as the clearing of a protected forest, the creation of a forest reserve, the designation of a groundwater protection zone, the construction of a landfill for inert materials, the protection of crop rotation areas, the enactment of stricter emission limits for wood-burning stoves or the introduction of a climate tax are thus interpreted as differences of opinion based on an interpersonal use conflict.

Figur 2: New residential areas and protection forest in Schwarzsee (Canton Fribourg): Who is causing the problem? Local planning with its protection requirements or the forest owners, who (perhaps) neglect the stability of their forests?



In the model world, the allocation of rights is allocatively irrelevant

Dealing with scarcity or opportunity costs is the essence of economics. It is therefore not surprising that Coase develops his ideas further and applies them to the allocation of radio and television frequencies:

But it is a commonplace of economics that almost all resources used in the economic system [...] are limited in amount and scarce, in that people would like to use more than exists. Land, labor, and capital are all scarce, but this, of itself, does not call for government regulation. [...] But the way this is usually done in the American economic system is to employ the price mechanism, and this allocates resources to users without the need for government regulation. [...] But the real cause of the trouble was that no property rights were created in these scarce frequencies. [...] But if no property rights were created in land, so that everyone could use a tract of land, it is clear that there would be considerable confusion and the price mechanism could not work because there would not be any property rights that could be acquired. (Coase 1959: 14)

For Coase, it is therefore clear that the decisive step is the allocation of the property right. The market process will then automatically allocate the property right to the person who values it most highly and pays the most for it. In other words, it makes absolutely no difference to the best possible use of the property right whether the property right is allocated to the emittent or the receiver. If it is not yet owned by the party with the higher willingness to pay, then the latter will acquire the right from the other party via an exchange, for example right for money. The new situation is economically efficient in the sense that both parties can no longer improve their position at the same time.

This observation, later referred to by Stigler (1966) as the Coase Theorem (CT), had a number of implications and opened the eyes of environmental policy to emissions trading. The CT caused great concern among lawyers because it allowed the study of law using economic instruments.³ This much can be said in advance: The CT actually applies – with a few restrictions – to the (then) economic model world. Coase himself regarded the CT at best as a springboard for a more real-istic economics.

... these insights are, in my view, without value except as steps on the way to the analysis of the real world of positive transaction costs. We do not do well to devote ourselves to a detailed study of the world of zero transaction costs, like augurs divining the future by the minute inspection of the entrails of a goose. (Coase 1981: 187)

The standard welfare economics approach falls short

With the help of the CT, Coase calls into question the tax known since Pigou (1920) to combat harmful effects. The stroke of genius here is that he beats the standard welfare economics approach of taxing the emittent at its own game. Among other things, Coase notes that (1) in the economic model world, the overall social optimum is automatically achieved with fully specified property rights via the price mechanism; (2) the injured party is not compensated (with the tax revenue); (3) the correct amount of the environmental or Pigou tax cannot be determined; (4) a tax does not sufficiently differentiate between the amount of the actual harmful effect and the costs of averting the danger to the recipient and may even cause additional damage.

³ Economic Analysis of Law, cf. Marciano (2007).

But he [Pigou] is wrong when he describes these actions as «anti-social.» They may or may not be. It is necessary to weigh the harm against the good that will result. Nothing could be more «anti-social» than to oppose any action which causes any harm to anyone. (Coase 1960: 35)

The legal system influences the transaction costs of problem solving

Since his student days, it has been clear to Coase that every social coordination causes costs. With the introduction of transaction costs (TC), Coase was the first to plausibly explain the existence of firms (Coase 1937). In economics, TCs have various meanings (Klaes 2008); in the context of environmental use conflicts, the term institutional costs (Cheung 1998) or, in the author's opinion, social coordination costs could also be used. Cheung (1998) sums it up best: *«Transaction costs» must be defined to be all the costs which do not exist in a Robinson Crusoe economy.*

Coase now makes several observations. He points out that the legal system influences the TC of all problem solutions. This means that the various solutions for avoiding harmful effects are differently efficient and the distribution of property rights becomes allocatively relevant again. *The argument has proceeded up to this point on the assumption [...] that there were no costs involved in carrying out market transactions. This is, of course, a very unrealistic assumption. [...] ... the initial de-limitation of legal rights does have an effect on the efficiency with which the economic system operates. (Coase 1960: 15–16)*

It is clear to Coase from the outset that the nature of the environmental problem can be very different, because the conflict situation can affect more than just two people:

When large numbers of people are involved, the argument for the institution of property rights is weakened and that for general regulations becomes stronger. [...] Of course, if there were only one source of smoke and only one person were harmed, no new complication would be involved [...]. But if many people are harmed and there are several sources of pollution, it is more difficult to reach a satisfactory solution through the market. When the transfer of rights has to come about as a result of market transactions carried out between large numbers of people or organizations acting jointly, the process of negotiation may be so difficult and time-consuming as to make such transfers a practical impossibility. Even the enforcement of rights through the courts may not be easy. [...] As a practical matter, the market may become too costly to operate. (Coase 1959: 29)

The better problem-solving approach compares the costs of the alternatives

For Coase, it is clear that every solution to a problem incurs costs. Just as a company decides whether to outsource production on the basis of the advantages and disadvantages identified, the total opportunity costs of the possible solutions must be compared in order to eliminate harmful effects. It cannot be ruled out that the best solution is to do nothing.

...that the problem is one of choosing the appropriate social arrangement for dealing with the harmful effects. All solutions have costs and there is no reason to suppose that government regulation is called for simply because the problem is not well handled by the market or the firm. Satisfactory views on policy can only come from a patient study of how, in practice, the market, firms and governments handle the problem of harmful effects. (Coase 1960: 18)

Furthermore we have to take into account the costs involved in operating the various social arrangements [...], as well as the costs involved in moving to a new system. In devising and choosing between social arrangements we should have regard for the total effect. This, above all, is the change in approach which I am advocating. (Coase 1960: 44)

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As a protagonist of the opportunity cost approach (Coase 1938/1973), he believes that this not only shows the way methodically for business decisions, but also for the maximization of the social product (Figure 3). For him, however, it is not enough to simply compare production costs, which is why he recommends a broader evaluation approach.

As Frank H. Knight has so often emphasized, problems of welfare economics must ultimately dissolve into a study of aesthetics and morals. (Coase 1960: 43)

Figur 3: Traditional flocks of migrating sheep move across land without the explicit consent of the landowners, as here in Uetendorf in the Canton Bern – a simple and customary local institutional arrangement under the Civil Code.



Farmer and rancher – an illustration

The initial situation

Imagine that a rancher (cattle farmer) and a farmer (corn farmer) are neighbors. The farmer only cultivates the best part of his land, while the rancher lets her cattle graze freely. Originally, there was no fence separating the two plots of land. As a result, the rancher's cattle repeatedly cause damage to the farmer's cornfield. The rancher can fence off her land or the farmer can fence off his maize field (Figure 4). However, the fence around the corn field is more favorable because it is shorter. Using this example, the controversies raised by PSC can now be illustrated relatively easily. For this purpose, ten different cases are constructed with fictitious figures that differ in terms of rights allocation, transaction costs and damage.

Anarchy (case 1)

Farmer and rancher find themselves in the Hobbesian «war of all against all». Anarchy reigns and open conflict threatens. Perhaps there is a constitutional state that enforces property rights. However, when it comes to the rancher's duty to fence, there are neither legal regulations nor established social traditions. There is «chaos» and conflict costs arise for both sides (Table 1). The situation is paradigmatic for many environmental problems in modern society. The difficult situation gives rise to the formulation of the first normative Coase theorem: *«Structure the law so that all valuable property rights are fully allocated.»*

Figur 4: Situation and fencing costs of rancher and farmer.



Pigou intervenes (case 2)

Pigou sees the problem in the fact that the rancher does not include her neighbor's costs in her decision-making process. Her private costs are not identical to the total costs, which is why she produces too much meat. Pigou therefore levies a tax on the rancher in the amount of the damage to her neighbor (Table 1). The rancher adds the tax to the price of the meat, as a result consumers reduce their meat consumption, the rancher reduces the size of her herd and the damage to the farmer decreases.

attribut	who			case		
		1	2	3	4	5
compulsory fencing for rancher		unknown	no	yes	nein	yes
potential crop failure	farmer	-100	-100	-100	-100	-100
actual fence costs	farmer	0	0	-25	-50	-50
	rancher	0	0	-25	0	0
actual taxes	rancher	0	-50	0	0	0
	consu- mers	0	-50	0	0	0
actual crop failure	farmer	-100	-35	0	0	0
fence contract farmer-rancher	farmer	0	0	0	0	65
	rancher	0	0	0	0	-65
profit	farmer	< -100	-35	-25	-50	15
	rancher	< 0	-50	-25	0	-65
exchange loss of the tax (deadweight loss) plus administrative costs of the tax		0	-40	0	0	0
total economic costs		< -100	-75	-50	-50	-50
efficient		nein	nein	yes	yes	yes
exchange gain		0	0	0	0	25
involuntary redistribution (tax revenue of the state)		0	100	0	0	0
remark		chaos	Pigou	mariage		СТ

Tab. 1: Fictitious annual costs of a land use conflict between a rancher and a farmer (cases 1–5). The potential exchange costs are 0. Source: based on Cooter & Ulen (2008).

However, the state's intervention has even more consequences. There is a redistribution of wealth, with the meat consumers and the rancher being worse off and the taxpayers better off. Although the rancher is not obliged to keep a fence, the farmer is also better off. However, he still suffers crop damage, which he accepts because his fencing costs are higher than the crop damage.

Figur 5: The taxation of the rancher in the price-quantity diagram (P, Q) with different supply and demand elasticities. If ranchers (s) and meat consumers (d) behave very elastically, then the environmental tax (black line) works best (diagram 1). The tax is tantamount to making production more expensive (s_r). However, the tax then no longer generates any revenue and effectively destroys the entire exchange profit. The situation is different with very inelastic behavior: Taxing the consumers (green area) and the rancher (brown area) leads to a high tax revenue, while the exchange losses (blue area) are low (diagram 4). Because meat production is hardly declining, the farmer's harvest loss remains de facto the same. The elasticities in diagrams 2 and 3 lie between these two extreme cases.



Tab. 2: Fictitious annual costs of a lan	d use conflict between a rancher	and a farmer	(cases 6–10).
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attribut	who			case		
		6	7	8	9	10
compulsory fencing for rancher		no	yes	no	yes	yes
potential exchange costs	farmer	0	0	-50	-50	-5
	rancher	0	0	-50	-50	-5
potential crop failure	farmer	-20	-20	-100	-100	-100
actual fence costs	farmer	0	0	-50	0	-50
	rancher	0	0	0	-75	0
actual exchange costs	farmer	0	0	0	0	-5
	rancher	0	0	0	0	-5
actual crop failure	farmer	-20	-20	0	0	0
fence contract farmer-rancher	farmer	0	0	0	0	65
	rancher	0	0	0	0	-65
damages awarded by a court	farmer	0	15	0	0	0
	rancher	0	-15	0	0	0
profit	farmer	-20	-5	-50	0	10
	rancher	0	-15	0	-75	-70
total economic costs		-20	-20	-50	-75	-60
effizient efficient		yes	yes	yes	maybe	yes
exchange gain		0	0	0	0	15
remark		not rele- vant	decision by judge	Hobbes (norma- tive)	com- parison neces- sary	CT (norma- tive)

The tax itself also has economic effects: Firstly, it results in exchange losses between ranchers and consumers, which actually have an impact on the desired elastic behavior (Figure 5). And secondly, the tax causes administrative costs. Apart from that, as Coase also noted, it is not possible to determine the optimal tax level due to a lack of information. In the constructed fictitious example, it remains a mystery to what extent the Pigouvian tax maximizes social welfare in any way at all.

Exchange in the Stigler world (cases 3-7)

In the third edition of his textbook, Stigler (1966) – perhaps still baffled – baptized the CT and thus indirectly made the strange world without TC known in wide circles. Stigler was well aware of the unrealistic assumptions of the CT (Stigler 1966, 1988). However, this did not prevent him from popularizing the CT. It therefore seems fair to refer to the world without TC as the «Stigler world» (Tables 1 & 2).

- Case 3: Farmer and rancher marry and merge their two farms. As a result, they optimize their operation with a new fence around the corn field.
- Case 4: The farmer erects a fence around his corn field to prevent even greater damage.
- **Case 5:** The rancher and the farmer agree on the fencing of the corn field and agree on a fence price of 65 (Coase theorem). Both the rancher, who would otherwise have fence costs of 75, and the farmer are in a better position.
- Case 6: The farmer does without a fence around his corn field because a fence does not make him better off.
- **Case 7**: The rancher willfully accepts the farmer's damage. He sues her in court for damages. The judge recognizes the claim and sets the amount of damages at 15 on the basis of an estimate.

Exchange in the Coase world (cases 8-10)

In Coase's world, the CT does not apply because TCs are omnipresent. However, the last three cases show (Table 2) that TCs can sometimes be small and sometimes large.

- Case 8: The farmer erects a fence around his corn field to prevent even greater damage. The amount of TC is irrelevant because the farmer and the rancher do not have to coordinate at all. The case illustrates the normative Hobbes theorem: *«Structure the law in such a way that the smallest possible damage is done if the private exchange fails»* (Cooter & Ulen 2008). Applied to road traffic, this means that the right of way should always be allocated to the main road and not the side road.
- Case 9: The rancher and the farmer cannot coordinate because the costs are too high. According to Coase, other institutional framework conditions must always be examined. The cheapest solution may actually be for the rancher to build a fence. But perhaps a Pigou tax or regulation will prove to be the most favorable. It would be conceivable, for example, for the farmer to be obliged to build a fence, combined with the right to charge the rancher for the fence costs.
- **Case 10**: The rancher and the farmer agree on the fencing of the corn field, the price mechanism also plays out in the «second-best» world thanks to relatively low TCs. The example illustrates the second normative Coase theorem: «*Structure the law in such a way that exchange is not hindered as much as possible*» (Cooter & Ulen 2008). The strength of exchange, the utilization of private information, comes into its own. There are many such applications in spatial and environmental policy today (e.g. CO2 exchanges, land certificates or emission credits).

The illustration of the use conflict based on two neighbors clearly shows the different thinking of Pigou, Stigler and Coase (Table 3). Pigou is characterized by his (hasty) solution to the problem by means of a tax and his neglect of the distributive effects. Stigler is convinced of exactly the opposite, who – exaggeratedly depicted – lives in the best of all worlds of Dr. Pangloss and, according to the motto «The market will sort it out», sees no reason for any solutions. Coase himself stands out from the other two primarily through his careful analysis of the situation and his differentiated perspective. Unlike Pigou, he does not use a fictitious ideal world as a reference point, but the real world.

Characteristic	Pigou	Stigler	Coase
Concept of ownership (property rights)	undifferentiated	differentiated	differentiated
Problem	guilty, not guilty	reciprocal	reciprocal
Transaction costs	0	0	> 0
Initial state	not efficient	always efficient	maybe efficient
Effect of a change in the law	allocative (and distributive)	distributive	allocative and distributive
Approach	tax	no solution neces- sary (best of all worlds)	choose the most favorable institu- tion
Working method	Blackboard econo- mics	Blackboard econo- mics	Study of the real world

Tab. 3: A comparison of the thinking of Pigou, Stigler and Coase.

Night does not turn into day so quickly

The depiction of the CT in George Stigler's influential textbook led to an intense debate among economists and lawyers in the 1970s and 1980s. Did Stigler come under fire? On the contrary: for around 20 years, it was not him but Coase and «his» theorem that came under fire. In retrospect, the debate seems somewhat strange, as the critics are not concerned with the conclusions drawn by Coase in PSC, but with their own model assumptions. In general, it is difficult to understand why Stigler came up with the idea of referring to frictionless exchange as Coase's theorem.

The «Coase» theorem as understood by George Stigler or Paul Samuelson is actually Adam Smith's theorem (1776). It is wholly explicit in F.Y. Edgeworth (1881 [...]); and with all bells and whistles in Arrow and Debreu (1954). Smith, Edgeworth, Arrow, Debreu, with many others, noted that an item tends to gravitate by exchange into the hands of the person who values it the most, if transaction costs [...] are not too high. (McCloskey 1998: 240)

Summaries of the debate (Medema & Zerbe 2000, Parisi 2008) show that intensive engagement with the CT greatly improves understanding of the exchange process in any case. Medema & Samuels (1997) have made a whole series of assumptions as to why Coase himself only intervened relatively late in the debate and corrected the misinterpretation of PSC. However, the misunderstandings have still not been overcome today, as most textbooks present Coase solely as a utopian advocate of unrealistic negotiations (Butler & Garnett 2003).

The harsh criticism of James Buchanan

James Buchanan and Ronald Coase were both strongly influenced by Frank Knight (Buchanan 2005), which is reflected, for example, in their commitment to the opportunity cost approach (e.g. Buchanan 1969/1999, Coase 1938/1973). At first glance, it is therefore rather surprising that Buchanan (1984/1999) criticizes PSC, sometimes severely, and regards TC as irrelevant. However, in contrast to the many critics of the CT, who ultimately only scrutinize their own model assumptions, Buchanan's objections are directed against one of Coase's central recommendations, that of comparing the costs of alternatives. Like Coase, Buchanan also stands in the tradition of methodological individualism. Unlike most economists, however, Buchanan goes one step further by taking the preferences of the people being analyzed as the sole value basis for the analysis (normative individualism, cf. Vanberg 2005). Building on this, Buchanan subsequently develops a constitutional economics which, among other things, makes a strict distinction between hierarchically organized rules of the game and moves. He accuses Coase of subjecting social decisions about lower-order rules of the game too strongly to the opportunity cost approach.

Leschke & Sauerland (2000) have vividly illustrated Buchanan's objections using the well-known 2-person prisoner's dilemma (Figure 6). The dilemma for the prisoners is that they have been placed in individual cells and are now unable to communicate (cooperate) with each other. To satisfy the examining magistrate, both therefore defect (D) and offer themselves as key witnesses (light blue quadrant in Figure 6). As the example shows, cooperation between people or the minimization of transaction costs is sometimes socially undesirable.

Figur 6: 2-person prisoner's dilen	1ma. The two prisoners	(i, j) can remain sile	nt (C) or confess	(D). The
following sentences apply to the t	wo prisoners: S > P > R	> T. Source: Leschke &	& Sauerland (2000	ı).

i	C	D
с	(R;R)	(S;T)
D	(T;S)	(P;P)

Buchanan's criticism points out that people are free to decide which individual criteria they apply when making collective decisions about the rules of the game. Presumably, they will not always choose the one that minimizes costs. For example, price, quantity and quality agreements between companies already lead to increases in production value for these companies. However, the social consensus will tend to make such agreements more difficult by means of the highest possible transaction costs, i.e. with strict competition law. Buchanan, who sees his research program as a counter-proposal to welfare economics (Buchanan 1959), shies away from using the term efficiency in connection with exchange processes.

«That which emerges» from the trading or exchange process, conceived in its narrowest or its broadest terms, is not the solution to a maximizing problem, despite the presence of scarce resources and the conflict among ends. «That which emerges» is «that which emerges» and that is that. (Buchanan 1975: 226)

Medema & Samuels (1997) also point out that Coase, as an uncompromising advocate of the opportunity cost approach, strangely neglects the problem of the subjectivity of all costs and calculates them like an omniscient welfare economist. In addition, they also identify a circularity problem in Coase's argument: if institutional arrangements do indeed cause different TC, how is it even possible to compare TC between different institutional arrangements?

Both the criticism of Buchanan (1984/1999) and that of Medema & Samuels (1997) actually hit a sore point in Coase's argumentation. He has not yet freed himself sufficiently from the cost-benefit thinking of welfare economics. Despite his fierce criticism of Pigou and welfare economics, he too cannot completely escape their spell. In his defence, however, there are several reasons: (1) Coase had already recognized the problem in PSC and pointed out the aesthetic and moral aspects of social decisions; (2) Coase is not a political economist, but is concerned with the economics of governance structures; (3) at the time of the publication of PSC, Buchanan's research programme was still in its infancy; (4) Coase's study of the common law revolves around the judges' interpretation of the law rather than questions of basic rule consensus (Leschke & Sauerland 2000).

Allocation versus coordination paradigm

Another interesting question arises when locating Coase in the field of tension between the two prevailing paradigms in economics: the allocation paradigm⁴ and the coordination paradigm. Identified and described by Kohn (2004), these represent fundamentally different views of economic theory. The allocation paradigm focuses on opportunity costs and equilibrium, while the coordination paradigm emphasizes exchange and disequilibrium.

Coase takes a bottom-up approach. Exchange opportunities are not simply given, they have to be sought and discovered. Prices do not simply exist, they are found, made and changed again. The exchange is personal and takes place between individuals, information is scarce and asymmetrical, prices are set strategically and markets are thin.

In his interpretation, Kohn (2004) assigns Coase to the coordination paradigm – despite his not entirely successful detachment from welfare economics. Coase's contributions (1937, 1946, 1960) shed light on the «black boxes» of the market, the firm and the state. The latter is no longer a deus ex machina, but one of several institutions that stands out from the others solely through its technology, coercion. All institutions are objects of investigation because they structure and allocate property rights, result in coordination costs and direct social cooperation, more or less productively. In such a dynamic scheme of thought, the widespread concepts of market and state failure are irrelevant.

Coase has already made it clear that markets, companies and regulations provide different levels of coordination. In the example of the rancher and the farmer, for example, the joint company (case 3) proved to be expedient, while the Pigou tax (case 2) proved to be inexpedient – at least in an environment of low TC. However, Coase's considerations help to bring the rules of the game that Buchanan repeatedly emphasized more and more to the fore. These determine which social decision-making procedures are used in the constant reallocation of rights and the estab-

lishment of institutions. Poor coordination performance or coordination failures are therefore not attributable to market, company or state institutions, but rather to inappropriate social rules of a higher order or to a democratic or constitutional failure.

Coase, valuable fertilization of forest economics

PSC has co-founded or at least inspired three broad areas of research: The New Institutional Economics, Organizational Economics and the Economic Analysis of Law. All three fields of research have a large number of sub-disciplines and are extremely successful. Coase and his colleagues have probably had the greatest impact on the legal sciences. These include, for example, an intensive examination of the concept of property, the «merging» of property and liability law, a new understanding of liability law and theories on the efficiency of common law.

The three new areas of research mentioned above are of great importance for forest economics because they describe the social environment of the forest. The new field of institutional economics, which is applied to the use and protection of forests and sheds light on the subtle interplay between formal and informal rules, is well established. Closely related to institutional economics is organizational economics: How can the timber value chain be organized? How can forests owned by groups be used sustainably? Organizational economics received recognition when Elinor Ostrom and Oliver Williamson were awarded the Nobel Prize in 2009.

The economic analysis of law has received less attention to date. Its potential for innovation is considerable, which is why it should be increasingly incorporated into forest research. For example, the in-depth analysis by Calabresi & Melamed (1972), which identified three types of rules for the protection of property, was groundbreaking in every respect: Property rules, liability rules and non-transferability rules. They found that in the case of harmful effects, ownership rules protect either the emitter or the receiver, while liability rules always protect only the receiver. To complete the system of rules, they therefore postulated a liability rule to protect the emitter - the so-called Rule 4.

Missing is a fourth rule representing an entitlement in Taney to pollute, but an entitlement which is protected only by a liability rule. The fourth rule, really a kind of partial eminent domain coupled with a benefits tax, can be stated as follows: Marshall may stop Taney from polluting, but if he does he must compensate Taney. (Calabresi & Melamed 1972: 1116)

Property and liability rules differ in that the former are based on voluntary exchange and therefore take into account the subjective preferences of the exchange partners. In contrast, liability rules facilitate coordination between people when TCs are high. They are therefore to be interpreted as forced transfers in which compensation is determined by a judge or a norm. These insights are very important for understanding environmental use conflicts. Rule 4, for example, is widely used in federal nature and landscape conservation. Further constructed rules also make it easier to separate allocative and distributive goals and to eliminate information deficits and misguided incentives (Ayres 2005). However, the distinction between voluntary exchange and forced transfer is very important in forest valuation. The strict distinction between voluntary and involuntary transfer of property rights quickly reveals some confusion – for example in the appraisal of game damages – because compensation and exchange price are no longer confused (Deegen & Hostettler 2010). Figur 7: Forest entrepreneur in Montana (USA) bundling property rights.



Coase's thinking is valuable for forest economics in every respect. It perceives forest ownership as a complex bundle of property rights and sharpens the focus on the allocation of rights and the redistribution of rights by regulation. The many terms used in forest law, such as prohibition of forest conversion, adverse use, forest clearance, accessibility, prohibition of clear-cutting, protection forest, biodiversity, show impressively that environmental use conflicts are omnipresent in forestry. Accordingly, it is always important to discover and compare possible solutions to problems without prejudice. Coase's thinking never neglects the institutional environment in which the forest and its use are embedded. It opens up new fields of business for the forest entrepreneur by means of a clever combination and organization of property rights (Anderson & McCormick 2004, Figure 7). Last but not least, it propagates the discovery of new exchange opportunities – for example by means of contractual nature conservation.

Economists should study the real world

Coase rejects model Platonism (Albert 1998) as blackboard economics. Coase's three major essays (1937, 1946, 1960) fundamentally challenged common textbook views on markets and firms, on pricing in natural monopolies and on »negative externalities». He succeeded in gaining a better understanding of property and frictional forces in society and getting to the bottom of previously little understood phenomena. Coase on this in his Nobel Prize speech:

What is studied is a system which lives in the minds of economists but not on earth. I have called the result «blackboard economics.» The firm and the market appear by name but they lack any substance. The firm in mainstream economic theory has often been described as a «black box.» And so it is. (Coase 1992: 714)

Coase's argument is successful because he distances himself from the abbreviated presentation of social coordination problems in the textbooks. Instead, he takes an in-depth look at the environmental problems described by Pigou. Coase analyzes around a dozen court cases and

considers their economic impact. The methodological innovation is twofold. Firstly, Coase takes an in-depth look at the legal system and its impact on the real world.⁵ Secondly, Coase refuses to use a mathematical model to «precisely» summarize his insights. Rather, his focus is on a conscientious examination of the real world and how problems have actually been solved by laws and judges in the past.

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