UNIVERSITÄT LEIPZIG

Wirtschaftswissenschaftliche Fakultät
Faculty of Economics and Business Administration

Working Paper, No. 72

Paul Lehmann /
Christoph Schröter-Schlaack /

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August 2008

ISSN 1437-9384

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Paul Lehmann and Christoph Schröter-Schlaack

Helmholtz-Centre for Environmental Research – UFZ
Department of Economics
Leipzig, Germany

Paul Lehmann
Christoph Schröter-Schlaack
Helmholtz Centre for Environmental Research – UFZ
Department of Economics
Permoserstr. 15
04318 Leipzig
Germany
Tel. ++49 341 235 3173
Fax. ++49 341 235 2696
e-mail: Paul.Lehmann@ufz.de
Christoph.Schroeter-Schlaack@ufz.de

Regulating Land Development with Tradable Permits: What Can We Learn from Air Pollution Control?[1]

Abstract

Growing criticism of land consumption labelled as "urban sprawl" has triggered a vigorous debate on how to control land development. Tradable development rights – as one form of tradable permits – are increasingly discussed as an alternative to traditional land use planning. Based on a review of the economic literature on controlling air pollutants, three lessons for regulating land development with tradable permits are derived in this paper. First, a single permit trading scheme cannot efficiently regulate land development. It either neglects the heterogeneity of damages from land development or brings about prohibitively high transactions costs. Second, these inefficiencies may be (partly) overcome under a policy mix combining permit trading with a zoning approach or individual planning approvals. Third, a pragmatic approach may build on existing land use planning systems and implement a tradable development right scheme on top of it.

Keywords: land development; policy mix; permit trading; tradable development rights, land use planning; environmental benefits; transaction costs

JEL Codes: Q24, Q28, R52

[1] An earlier version of this paper was presented at the workshop of the Research Network "NIÖ - Neue Institutionenökonomik", held at Universität Leipzig, November 5th 2007.

1. Introduction

Extensive land development – often subsumed under the label "urban sprawl" – has been widely blamed for a variety of economic, social and environmental problems (e.g. Freeman 2001, Paul and Meyer 2001, Burchell et al. 2002, Ewing et al. 2003, e.g. McKinney 2006). In economic terms, these problems can be attributed to the failure of private land markets to allocate the resource land efficiently – that is welfare-maximizing – to different possible uses. Economists have constantly argued that the presence of a market failure may call for government intervention into private markets (Pigou 1920, Samuelson 1954). This is widely acknowledged for controlling land development as well[2]. Traditionally, land development has been controlled by land use planning, i.e. private landowner's property rights are restricted by requiring permission for development activities. In theory, authorities should be able to grant land development permissions efficiently, i.e. such that they maximize the balance of overall benefits and costs of land development and its control, respectively. Authorities can be assumed to be well informed about the individual economic benefits from land development as these are expressed in real estate prices. They can put these into perspective with benefits from regulatory services, such as natural habitats, water drainage and flood control, which are forgone by land development. Thereby, land use planning may take into account the heterogeneity of both benefits and costs (in terms of foregone benefits) of land development.

However, the performance of traditionally employed planning regulations like zoning or the use of density restrictions for residential development is scrutinised frequently (e.g. Pasha 1996, Pendall 1999, Thorsnes and Simons 1999, Gordon and Richardson 2001, Persky and Kurban 2003, e.g. Anthony 2004). Particularly, planning often fails in enforcing soil protection or safeguarding regulatory services arising from untouched natural landscapes. These shortcomings may be attributed to the high degree of decentralization in existing planning systems (European Commission 1999, Schultink et al. 2005). As local level bodies, e.g. municipalities and counties, often hold the ultimate decision authority, some of the costs of allowing land development are externalised to neighbouring communities (traffic, noise and pollution, overuse of water resources) or to society as a whole (habitat fragmentation, loss of soil diversity). What is more, land development is impelled further by public subsidies for traffic infrastructure or fiscal transfers based on population numbers, both of which shift development costs from local communities to the general public budget. Hence, current land use planning at the local level may

[2] Indeed, the argument was raised that the economic rent of land should be shared by society rather than falling into private hands (George 1912). Starting from there a lively debate grew about how the state should appropriate landowner's rent (Rothbard 1997, Gihring 1999, Gillette 2001, Brueckner and Kim 2003).

tend to designate more land for development than what would be desirable from a regional, national or global point of view. Thus, although theoretically optimal, land use planning becomes a sub-optimal policy for controlling land development in its current institutional setting. A simple solution to these problems could involve shifting responsibilities for land use planning to regional or national authorities. However, legal and constitutional restrictions protecting the participation of local authorities usually impede such institutional changes. Subject to this institutional restriction, the paper analyses options to enhance the efficiency of land development control.

The quest for instruments to enforce regional or national restrictions on the amount of land to be developed gave rise to so-called smart growth-policies in the US, where the use of tradable permits to control land development is increasingly considered (e.g. Cohen 2002, Frece 2005). These so-called tradable development right (TDR) schemes allow setting a quantitative cap on land development at the regional or national level while still leaving some discretionary power to local authorities. These are free to develop as much land as they desire if they only hold a sufficient amount of permits. Tradable permits thus permit a compromise between the participation of local authorities and a national interest in land development control. What is more, the earnings from selling TDRs compensate communities for the foregone profits of postponed or banned land development.

Text book economics tends to focus on the analysis of single policy instruments. Consequently, tradable permits and land use planning would be perceived as alternatives. However, it is the aim of the paper to show that a single instrument strategy is not appropriate for controlling land development efficiently. For this purpose, the economic literature on controlling air pollutants is reviewed. Air pollution control was the first field of regulation where tradable permits were implemented, and it raised similar instrumental challenges as controlling land development. Based on the review, three lessons are identified which can be learnt for controlling land development. First of all, single tradable permit schemes either do not account appropriately for the heterogeneity of benefits from land development control or provide for prohibitively high transaction costs. Second, this inefficiency can (at least partly) be overcome by a policy mix combining tradable permits with a zoning approach or individual planning approvals. Both approaches may increase benefits from land development control compared to single permit trading and bring down related transaction costs. Third, an unambiguous plea for one of the policy mix options is not possible on a theoretical level. However, a pragmatic approach may build on the existing system of local land use planning and implement a TDR scheme on top of it.

The paper is structured as follows. Section two presents the analytical framework. It introduces the concepts of benefits, abatement costs and transaction costs for the context of land

development control. Section three reviews the experiences with using permit trading for air pollution control. Section four derives the lessons learnt from air pollution control for the regulation of land development. Section five concludes.

2. The Analytical Framework

The economic analysis of tradable permits for controlling land development will focus on the efficiency of regulation. The efficiency criterion requires that a policy instrument provides for the maximum increase in social welfare possible. This implies that a tradable permit scheme has to maximize the balance of benefits and costs resulting from controlling land development For the purpose of this analysis, costs will include abatement costs and transaction costs. The optimal level of land development control is attained when marginal benefits equal marginal costs. The reduction of development by another unit would then bring about marginal costs which exceed the resulting benefits. In the following, the concepts of benefits, abatement costs and transaction costs will be illustrated in more detail for the context of land development control.

2.1. Benefits of Controlling Land Development

Every parcel of land offers a variety of different services, depending on its natural conditions, such as soil type, steepness, natural cover etc. as well as on anthropogenic investments, such as infrastructure provided or buildings erected (Scott et al. 1998). Whereas regulatory services provided by a site, e.g. flood control by water drainage, filtering of ground water or the sorption of nutrients and toxic substances, as well as its natural habitat function for plants and animals mainly depend on its natural conditions, productive uses, such as farming, forestry or providing building ground heavily rely on anthropogenic inputs. As land development activities, like clear cutting, levelling and compacting or construction activities substantially alter the natural conditions of a site, most of the regulatory services previously provided get reduced or even destroyed. Hence, the benefits of controlling land development basically represent the value of regulatory services preserved[3]. As shown by others, these values can be of considerable size (e.g. Ellis and Fisher 1987, e.g. Barbier 1994, Barbier 2000).

The value of regulatory services provided by undeveloped land statically depends on two characteristics. Firstly - and most important - soils are heterogeneous ecosystems which are characterized by a varying composition of physical, chemical and biological materials and stocks. Soil development processes like decomposition, organic metabolism or water drainage, on which

[3] However, regulatory services provided are numerous and by no means homogeneously affected by a development decision. But to provide for intelligible analysis, it is rather assumed that they are so.

regulatory services are based, heavily depend on these natural conditions. Obviously, as soil composition varies among different sites the provided regulatory services will either. Secondly, surrounding land uses affect the regulatory services provided by a site and the value attached to them. While the ecological processes are distorted by neighbouring urban development (Alberti 2005), e.g. as habitats for endangered species get polluted by traffic emission of a crossing road, other benefits, like the recreational value of a municipal park or the flood control provided by a wetland might increase with the number of people having access to it. In addition, regulatory services or the habitat function provided by a site may be higher if it is located in the vicinity of other sites fulfilling similar functions.

Furthermore, the value of the regulatory services provided by a site may change dynamically, too (Wätzold and Drechsler 2005). As surrounding land uses change, e.g. by moving land development further into rural areas, the value of the regulatory services provided there will be altered (Costello and Polasky 2004). In the long run, even shifts induced at global level, such as climate change may have impacts on benefits provided by preventing land development. For example, reserve sites picked for the protection of endangered species might loose their function as natural conditions such as temperature, rainfall or humidity of the sites are altered (Köck 2006).

2.2. Abatement Costs of Controlling Land Development

Abatement costs of policies for land development control are mainly opportunity costs of foregone land development. Land development is a main driver for economic growth, increasing social welfare as well as private profits for the affected landowners. The provision of space for industrial, commercial as well as residential uses is held responsible for opening up additional choices where to live and work, generating new jobs, higher property values and higher tax incomes and lowering the costs of goods and services through greater economies of scale (Wassmer and Boarnet 2002). Not developing a patch of land prevents the generation of many of these benefits and therefore causes opportunity costs.

Opportunities costs will vary substantially among different patches. In a static perspective, they depend on two factors. Firstly, each parcel of land is unequally suitable for urban development depending on its (natural or) current conditions. For instance, wetlands, steep sites or contaminated brownfields will need much higher investments than greenfield-sites with best conditions for construction and infrastructure development. Secondly, characteristics induced by its spatial location and distance to other types of land use are crucial for determining the opportunity costs of not developing a site. Residential development close to land uses with positive impacts (e.g. public infrastructure like sewing systems, public transit or schools) or open

space amenities is more profitable than developments close to land uses with negative impacts (e.g. noisy roads, polluting industrial plants or smelly stock-breeding) (Geoghegan 2002). This type of agglomeration economies are reflected by the observable land values that are highest in city centres and decrease in varying characteristics as one moves on to rural areas (Bento et al. 2006).

What is more, opportunity costs of not developing a site may also change dynamically. The ongoing trend of land development towards rural areas will increase their accessibility as well as the growing densification of established settlements will increase their attractiveness to landlords looking for large premises and residential lots (Costello and Polasky 2004).

2.3. Transaction Costs of Controlling Land Development

Controlling land development also brings about transaction costs. The concept of transaction costs was introduced by Coase for market transactions (1937). Later on, Coase (1960) himself and Williamson (1999) highlighted that transaction costs may also arise with regulations. Regulatory transaction costs may be incurred by the regulator as well as by the regulated party (Whitby et al. 1998, Falconer 2000). For public as well as private transaction costs, Birner and Wittmer (2004) distinguish between decision-making and implementation costs.

Decision-making costs are mainly costs of acquiring necessary information. Land developers incur costs because they have to find out about the relevant land use policy instruments and adapt their strategies accordingly. For example, a developer has to figure out where development is allowed and what types of development are permissible. The regulator incurs decision-making costs because he has to gain information on how to design policy instruments for controlling land development efficiently. In particular, he has to find out about the marginal benefits and costs of preventing development. Gathering this type of information may be hampered and made more costly due to asymmetric information between the regulator and the land developer. Developers usually have better knowledge about the expected costs and benefits of their developments, and may have an incentive to provide wrong information. For example, overstating benefits and understating costs may improve the possibility of a development to be approved. Further costs may arise for co-ordinating the decision-making process. Co-ordination costs may include the resources spent on meetings and mediating conflicts when parties with different interests are involved in designing a policy instrument (Birner and Wittmer 2004).

Implementation costs refer to the costs of monitoring and enforcing a policy instrument. In the context of controlling land development, these costs arise for the regulator because it cannot be taken for granted that the land developer actually complies with the policy instrument

(cf. Becker 1968). However, implementation costs may be incurred by the regulated party as well (Häder 1997). For example, the land developer may be obliged to provide evidence that he actually fulfils the obligations set out by the policy instrument. Moreover, enforcement efforts in the event of non-compliance, such as imposing sanctions, may call for further costly operations by the regulator. However, overall implementation costs of policy instruments for controlling land development can be expected to be low since monitoring land use changes is technologically easy, e.g. by aerial photography (Bizer and Bergmann 1998, Yang and Lo 2002).

3. Experiences with Tradable Permits for Air Pollution Control

Drawing on experiences with tradable permits for air pollution control is useful when designing policy instruments for land development control for two reasons. First of all, tradable permits were initially implemented to reduce emissions of air pollutants. The United States Acid Rain Program introduced a trading program for sulphur dioxide emissions as early as in 1990. The introduction was preceded and accompanied by a tremendous amount of economic studies providing a fairly comprehensive analysis of tradable permits. Second, the regulation of air pollution raises similar challenges as the regulation land development. As for land development, the marginal benefits of abating a unit of emission are heterogeneous for many pollutants, such as sulphur dioxide or nitrous oxide. Marginal benefits may vary spatially depending on ecological, technical and socioeconomic conditions at the point of emission as well as at the receptor points, such as wind direction, stack height and population density. What is more, abatement costs of reducing emissions may also differ considerably between sources. Costs of abating emissions include direct costs, e.g. for the installation of scrubbers, as well as opportunity costs, e.g. for foregone production of output. Both depend on the output an emitter produces and the inputs and technologies she employs. Hence there are grounds for the assumption that efficiency properties of policy instruments for air pollution control may also apply to instruments targeting land development control.

3.1. Single Tradable Permit Schemes

Direct regulation, such as air quality or technology standards, has usually been blamed for making abatement costlier than necessary. In contrast, tradable permits have been credited for minimizing the costs of controlling air pollution (Tietenberg 1985). They provide emitters with the freedom to either reduce emissions or to purchase the right to emit. Consequently, marginal abatement costs will equal the permit price for all emitters – which is the basic economic requirement for cost minimization. Tradable permit systems can be implemented at low

transaction costs if the marginal benefits of abating emissions are homogenous. That is, abatement benefits depend on the overall level of emission reduction but not on the individual location of the emitting source. This applies for example to carbon dioxide. In this case, regulators do not have to find out about individual benefits of abatement. For a trading scheme to be efficient, it can be simply based on emissions.

However, designing efficient policy instruments is more tedious if the marginal benefits of pollution abatement depend on the point of emissions. Montgomery (1972) demonstrates that an efficient allocation of pollution abatement in the presence of heterogeneous marginal benefits could theoretically be provided for by a system of "ambient tradable permits". Such a permit system requires the regulator to specify the impact matrix for each source relating emissions to resulting damages at all receptor points. Emitters have to acquire separate permits for each receptor point. Trade provides for the ratio of benefits and abatement costs to be maximized. Under this tradable permit system, the regulator incurs relatively low transaction costs. Her efforts are limited to specifying the impact matrix for all sources and allocating permits to them. Officials do not need information regarding marginal abatement costs (Krupnick et al. 1983). Yet, ambient permit trading schemes bring about high transaction costs for emitters (Baumol and Oates 1988). They have to participate in different permit markets for each receptor point affected by their emission. With many sites affected, an emitter has to acquire and manage a very complex portfolio of necessary permits. Moreover, receptor points may change over time with varying ecological, social and economic condition. Adapting an institutionalized set of receptors may be difficult (Krupnick et al. 1983). Tietenberg (1995) concludes that high transaction costs exceeding the balance of abatement benefits and costs have prevented ambient permit trading systems from being implemented.

Instead, policy-makers have chosen emissions trading approaches where heterogeneous pollution units are traded based on the level of emissions rather than on the actual damages of these emissions. This approach involves modest transaction costs since emitters have to participate in one market only, and it minimizes abatement costs. However, emissions trading may provide for inefficiencies in the presence of heterogeneous marginal pollution damages. For example, when few large sources are concentrated around a receptor requiring large improvements in ambient air quality, they have to be controlled to a higher degree than distant sources, which hardly affect the receptor. Emission-based policies, however, provide for marginal abatement costs to be equalized across all sources and tend to over-control distant sources and under-control adjacent sources (Tietenberg 1995). These approaches may aggravate existing or

give rise to new so-called hot spots, where concentrations of pollutants and resulting damages exceed socially optimal levels.[4]

Thus, disregarding the heterogeneity of marginal abatement benefits of air pollution control is usually not desirable from an efficiency point of view. However, incorporating it into a tradable permit scheme may bring about prohibitively high transaction costs. In order to reduce this inefficiency, two supplements to emissions trading have been proposed for air pollution control: zoning and individual approvals.

3.2. Tradable Permit Schemes and Zoning

The combination of tradable permits and zoning has been discussed and implemented for emissions trading. To overcome the inefficiency of unrestricted emissions trading in the presence of heterogeneous benefits from emission reductions, the permit market is split up into several markets or spatial zones. Zones are designed such that the benefits of abating emissions within each zone are rather homogenous – compared to a single emissions market. To each zone, a certain amount of permits is allocated. These permits can be traded freely within each zone. However, trading across zones is prohibited or may be allowed at predefined exchange ratios only (Tietenberg 1995, e.g., Hansjürgens and Fromm 1996).

This policy mix combines the advantages and compensates the disadvantages of tradable permits and direct regulation if implemented in isolation. Zoning provides for the consideration of the benefits of emission reductions. Reductions may be targeted to those zones where benefits are highest. Hot spots may be mitigated or avoided. Emissions trading provides for abatement costs to be minimised within each zone – and between zones to the extent inter-zonal trades are allowed. Thus at first sight, this policy mix may help regulators to efficiently control pollution of heterogeneous abatement costs and benefits.

However, regulators have to bear in mind several important drawbacks of combing permit trading and zoning. First of all, determining zones where abatement benefits are homogenous may be quite a challenging task with complex ecological systems – if not impossible. Trading schemes with spatial zones have been found inefficient because ambient effects of emissions do not only depend on the location of a source but on other factors as well, such as stack height (Krupnick et al. 1983). Baumol and Oates (1988) emphasize that zoning cannot incorporate all elements of complex environmental problems without losing the simplicity of one-to-one transfers within each zone. Regulators may be required to implement additional regulation, e.g.

[4] An empirical examination of the Acid Rain Program revealed that emission reductions occurred above all in those areas which would have been targeted under a more complex trading scheme (Swift 2001, 2004) Thus, gains from implementing an ambient permit trading scheme would have been small compared to the transaction costs it would bring about.

on maximum stack heights. Alternatively, the homogeneity of zones may be improved by increasing their number. Yet, with numerous small zones or markets, regulators have to incur higher transaction costs – and the competitiveness of the permit market decreases (Krupnick et al. 1983). Therefore, zoning seems to be desirable for pollution control only when sources can be clustered into a few groups with rather homogenous marginal abatement benefits (Baumol and Oates 1988).

What is more, the policy mix of permit trading and zoning brings about significantly high transaction costs. It imposes modest demands on emitters, which only have to participate in the permit market of one zone (Krupnick et al. 1983). However, decision-making to set up the policy mix efficiently is particularly cumbersome for the regulator (Krupnick et al. 1983, Tietenberg 1985, Baumol and Oates 1988, Tietenberg 1995). This is because zonal trading approaches make the final outcome dependent on the initial allocation of permits. The regulator has to determine efficient amounts of permits for each zone and possibly exchange ratios for trades across zones. To do so, she must gain knowledge of the impact matrix and the marginal abatement costs for each source – no matter whether these will be subject to trading subsequently or not. Thus, zonal trading brings about higher transaction costs than an ambient permit trading scheme which does not require information on marginal abatement costs. The regulatory task becomes even more complex in a dynamic perspective. As geographic patterns change, technologies evolve or population grows, the impact matrices as well as the marginal abatement costs may change over time. This implies that zones and permit allocation to zones have to be adapted continuously. This may be particularly costly once a fixed set of zones is institutionalized. Consequently, economists have advised against implementing zonal trading schemes for air pollution control.

3.3. Tradable Permit Schemes and Individual Approvals

Approvals set out trading rules. In contrast to the zoning approach, rules do not refer to the entire permit market but only to an individual transaction, i.e. a specific permit trade. An individual trade may be allowed without restrictions or at a specific trading ratio, or be ruled out. Unlike the zoning approach, individual approvals do not rely on zonal boundaries or predetermined fixed exchange rates (Tietenberg 1995). Economists have suggested to set trading rules with respect to local ambient air quality standards. Krupnick et al. (1983) proposed an approach of "pollution offsets" that allows trading among sources as long as it does not violate ambient air quality standards at any receptor point. New emitters have to acquire permits from existing sources in order to completely "offset" the effects of the new emissions on pollutant concentrations at receptor points. The approach was advanced by McGartland and Oates (1985). They examined "modified pollution offsets" allowing trading among sources if neither the initial

level of environmental quality nor certain predetermined ambient standards established by the environmental authority (whichever is more stringent) are exceeded. The approach promises to prevent the costly deterioration of air quality in areas where pollution concentration is already far below ambient air standards. An alternative approach was proposed by Atkinson and Tietenberg (1982). They suggested "nondegradation offsets" that allow trading among sources as long as local ambient air quality standards for the worst receptor are met and the overall emissions do not increase.

Like zonal trading schemes, direct regulation by individual approvals compensates for the deficiencies of tradable permit schemes. Subject to trading rules set out by individual approvals, permit trading provides for abatement costs to be minimised. The individual approval guarantees a minimum of environmental benefits for each transaction of a permit. Thus, it prevents trades where gains in terms of abatement costs come at significant reductions of abatement benefits.

Due to individual approvals, transaction costs of the policy mix are likely to be higher than with a simple emissions trading scheme. However, compared to an ambient permit trading system, this approach saves transaction cost since emitters are not required to participate in a multitude of separate markets. More importantly, permit trading restricted by trading rules is superior to zonal trading approaches in terms of transaction costs. This superiority arises because with trading rules the regulator does not need to know about the marginal abatement costs of each source to determine the initial allocation of allowances. Any allocation will do (Baumol and Oates 1988). Moreover, the individual impact matrix only has to be identified for those sources that are actually engage in trading – not per se for all sources as under zonal trading. In a dynamic perspective, trading rules also outperform zonal trading approaches because rules are determined on an individual basis, and no institutionalized set of zones has to be adapted (Krupnick et al. 1983).

Indeed, trading subject to rules may be more cumbersome for emitters than trading in zones. In a zonal system, emitters are free to trade with any other party located in the same zone. In contrast, with trading rules, emitters first of all have to identify potential trading partners and make sure that trading with them does not violate local ambient air quality standards. In doing so, emitters may face difficulties because the right to emit is state-dependent (Hahn 1986). If two sources trade, the impact matrices of their emissions (and potentially those of other sources as well) are changed and other trading opportunities are affected. Thus, the ecological and economic models of air pollution have to be run every time a trade is to be approved. Emitters cannot fall back on impact matrices learnt in the past but must gain knowledge anew for each trade. To bring down transaction costs, it has been suggested that regulators should play a more active role than just that of approving trades (McGartland 1988). Agencies could maintain a record of emissions and

trades, inform emitters about applicable impact matrices and even propose possibly beneficial trades. The underlying assumption is that gathering and providing this information at the central level of the regulator brings about less overall transaction costs than individual efforts by emitters. The combination of tradable permits and zoning may thus offer a promising approach to control emissions when abatement damages are heterogeneous. However, a final judgement has to be based on an empirical evaluation of ecological, technical and socioeconomic conditions.

4. Lessons Learnt for Designing Tradable Development Rights

4.1. Inefficiency of Single TDR Schemes

The first lesson learnt from air pollution control is clear-cut: Tradable permit schemes do not attain an efficient level of control if marginal damages are heterogeneous. This lesson can be transferred to the use of TDR schemes. In order to provide for low transaction costs, such scheme would have to be based on acreage. One permit would then allow its owner to develop one unit of land. Such a scheme would result in opportunity costs of land development control to be minimized. Those parcels of land would be exempt from development first where the potentials of development are lowest. However, pure TDR schemes would allow permits to be traded between distant parcels, which may provide very different regulatory functions. For example, the right to develop a parcel of cropland in a rural area could be traded to a forested parcel close to a city. The benefits provided by these parcels are by no means equivalent. Consequently, such trade is unlikely to be efficient. As for air pollution control, the consideration of heterogeneous marginal damages would make the trading scheme more complex. Benefits from land development control would be increased at the expense of higher transaction costs. This is particularly true since land provides multiple regulatory functions each of which may differ among parcels. Therefore, the transactions costs of a differentiated TDR scheme would probably be even higher than under ambient permit trading. Consequently, single TDR schemes are not necessarily preferable to classical land use planning.

4.2. Zoning vs. Individual Approvals as a Supplement to TDR Schemes

The second lesson learnt from air pollution control is that a policy mix outperforms single tradable permits if marginal damages are heterogeneous. Economists suggest combining tradable permit schemes with some kind of direct regulation. For air pollution, they clearly prefer individual approvals over zoning as a supplement to permit trading. This is mainly because

individual approvals do not require authorities to find out about marginal abatement costs while zoning does. Thus, transaction costs of the latter approach will be significantly higher.

However, the preference of individual approvals over zoning as a supplement to permit trading cannot be simply transferred to land development control for two reasons. First of all, transaction costs authorities have to incur to determine marginal abatement costs will be considerably lower for land development control than for air pollution control – although marginal abatement costs are heterogeneous in either case. This can be attributed above all to the characteristics of the resources under consideration. Air is a perfectly non-exclusive good, for which no market exists. There is no market price, which would reveal some information about the benefits of polluting different units of air. Thus, there is no indication of opportunity costs of avoiding pollution of that unit. Authorities themselves have to find out about them. In contrast, land is not a perfectly non-exclusive good. Some functions of land, particularly the provision of lots for development, are indeed marketable while others, such as regulatory functions are not. Real estate prices provide information about the expected benefits from developing a parcel. These benefits translate to opportunity costs which mainly determine the marginal abatement costs of land development control. Using real estate prices, authorities can therefore get a good idea of the marginal abatement costs land development control brings about. Since real estate prices are easily available to authorities, transaction costs for gathering information on marginal abatement costs are not much higher under zoning than under individual approvals for land development.

A second reason qualifying the preference of individual approvals over zoning for land development control is that zoning approaches are already in place in many countries, such as the United States and most Member States of the European Union. Authorities have already invested efforts in evaluating potential benefits of land development control in order to design and implement spatially differentiated zones for land development. In economic terms these efforts can be interpreted as sunk costs, which cannot be recovered. When deciding about future options of land development control, these costs have to be subtracted from the transaction costs of zoning approaches. Relying on a zoning approach because it is already implemented has further advantages in terms of transaction costs. Authorities as well as developers have gained valuable experience on how to handle zones. Maintaining established planning instruments also provides for enhanced faith of policy addressees in the durability of the regulation and may increase compliance and program participation. What is more, existing zoning approaches usually have generated constituencies which oppose any policy changes. Overcoming these path dependencies may be very costly in the short term – with respect to decision-making as well as implementation costs.

However, some of findings for individual approvals and zoning made for air pollution control also apply to land development control. On the one hand, individual approvals for TDR trades also bear the advantage that they can be easily adapted dynamically while modifying an institutionalized set of development zones in time is more difficult. On the other hand, zoning will involve less transaction costs for developers because these know in advance in which zone they are allowed to trade and do not have to find out about currently applicable trading ratios.

The discussion of individual approvals and zoning as a supplement to TDRs reveals that in contrast to air pollution no policy mix is per se superior to another. The final decision has to be made within the regional or national context of land development control. This decision has to be based on an empirical evaluation of the transaction costs that can be expected for either policy mix option.

4.3. A Pragmatic Approach for Designing TDR Schemes

The implementation of individual approvals as well as zoning in addition to TDRs may actually face the same problems as classical single land use planning. Both approaches should be implemented at the spatial level of the environmental problem – that is, usually beyond the local scale of municipalities and counties. Regional or national authorities should ideally be in charge of approving trades or designing zones. However, as for land use planning, this may violate legal and constitutional requirements.

A pragmatic approach may therefore maintain the existing system of land use planning – as it appears to be the strongest direct regulation politically and legally feasible – and implement a TDR scheme on top of it. Thus, local authorities continue setting up local development zones. In addition, regional or national authorities determine a cap on overall development within their responsibility and issue and allocate a corresponding number of tradable development permits. By doing so, regional and national planning levels can influence development patterns, as the initial allocation of TDR determines land development costs. Municipalities or developers with abundant development rights do not need to demand permits on the market, whereas communities without adequate initial allocation can still allow landowners to develop their land – but at costs increased by the permit price. Within such a policy mix system developers then basically have to meet two requirements in order to be allowed to build a house or road, for example. On the one hand, they have to obtain the permission from their local authority. This permission guarantees that the development is in line with (local) land use planning. On the other hand, the developer is obliged to hold a TDR. The TDR thereby provides for a regional or national cap of maximum development to be met. This pragmatic approach combines qualitative regulation (local land use planning) with quantitative regulation (regional or national TDRs).

Indeed, the pragmatic approach is only a second-best – or even third-best – solution which cannot provide for efficient land development control. In particular, the policy mix only considers local benefits but not regional or national benefits of land development control. However, it attains a higher level of efficiency than classical single land use planning. It limits the overall level of land development and provides for cost-minimization within the restrictions of land use planning. The policy mix also outperforms single TDR schemes. It provides at least for the consideration of the heterogeneity of local benefits from land development control.

To improve the efficiency of a policy mix for land development control, policy makers should strive for transferring responsibilities for zoning (or individual approvals) to higher authority levels. This will provide for regional and national benefits from land development to be considered and approach the ideal of land use planning. To some extent, policy-makers in the European Union have undertaken steps in this direction. The Flora-Fauna-Habitat Directive and the Birds Directive are supposed to set up a supra-national network of nature reserves. The European Water Framework Directive calls for an integrated management of river basins. Although being rather rough, the restrictions set out by these policy instruments will also affect local land use planning. They may therefore provide for heterogeneous inter-local benefits to be taken into account in a policy mix of land use planning and TDRs.

5. Conclusion

Land use regulation brings about multiple benefits, e.g. protection of social valuable landscapes or safeguarding regulatory services from undisturbed soils. However, land use regulation also produces a variety of economic costs, i.e. foregone benefits from land development as well as transaction costs of designing and implementing regulation schemes. In search for efficient ways to stop urban sprawl and facilitate dense land development patterns, tradable permit schemes are increasingly discussed and applied. Tradable permit schemes allow for an effective quantitative restriction of land development by requiring the landowner to hold an equivalent number of scarce development rights. What is more, as these rights are tradable among landowners, permit schemes tend to equalize marginal abatement costs, thus, the environmental goal is realised at least cost. However, when applied to resources with heterogeneous benefits from regulation, tradable permit schemes may lead to inefficient results. TDR schemes may either reduce the benefits from land development control if they steer development to sensitive and ecological valuable sites - or they may bring about prohibitively high transaction costs, as schemes perfectly considering the heterogeneous benefits of land development control become over-complex.

Based on a review of the theoretical insights and empirical experiences with tradable permits for the regulation of air pollution, the paper develops a pragmatic approach for designing TDRs. Although being only a second- or even third-best-solution, a policy mix of land use planning and tradable permits may improve the efficiency of land use control. In theory land use planning and its tools are capable of considering both benefits and costs of land use regulation, thus allowing for an efficient land development control. However, in most instances the actual performance of planning systems is decreased by the high degree of decentralization of planning authorities. For example, in many countries, local authorities possess the right to create development zones and to issue building permissions to landowners. Tradable permit schemes allows regional or national planning levels to set a quantitative cap of future urban development, but still leave a high degree of discretionary power to local level authorities. Common land use planning tools, like zoning or density regulations, can be facilitated by the targeted allocation of TDRs and the design of trading rules. Hence, for land use regulation, the most important advantage of tradable permits is not that they might minimize abatement costs. This could be theoretically provided by land use planning as well. Rather implementing TDRs increases benefits from land development control, since it allows a shift of responsibility to planning levels, at which a higher degree of external effects of land use decisions can be considered.

Acknowledgements

The authors are grateful to Florian Eppink and Jürgen Backhaus for their numerous and very helpful comments. The paper has also benefited from discussions with seminar participants at the Helmholtz-Centre for Environmental Research – UFZ, Leipzig, and Leipzig University.

References

Alberti, M. (2005): The effects of urban patterns on ecosystem function. International Regional Science Review 28 (2): 168-192.

Anthony, J. (2004): Do state growth management regulations reduce sprawl? Urban Affairs Review 39 (3): 376-397.

Atkinson, S. E. and Tietenberg, T. (1982): The Empirical Properties of Two Classes of Designs for Transferable Discharge Permit Markets. Journal of Environmental Economics and Management 9 (2): 101-121.

Barbier, E. B. (1994): Valuing environmental functions: Tropical wetlands. Land Economics 70 (2): 155-173.

Barbier, E. B. (2000): Valuing the environment as input: Review of applications to mangrove-fishery linkages. Ecological Economics 35: 47-61.

Baumol, W. J. and Oates, W. E. (1988): The Theory of Environmental Policy, 2. Cambridge University Press, Cambridge, UK.

Becker, G. S. (1968): Crime and punishment: an economic approach. Journal of Political Economy 86: 169-212.

Bento, A. M., Francob, S. F. and Kaffine, D. (2006): The efficiency and distributional impacts of alternative anti-sprawl policies. Journal of Urban Economics 59 (1): 121-141.

Birner, R. and Wittmer, H. (2004): On the Efficient Boundaries of the State - The Contribution of Transaction Costs Economics to the Analysis of Decentralisation and Devolution in Natural Resource Management. Environment and Planning C: Government and Policy 22 (5): 667-685.

Bizer, K. and Bergmann, E. (1998): Steuerung der Flächeninanspruchnahme über preisliche Anreize. Zeitschrift für angewandte Umweltforschung 11 (3-4): 358-377.

Brueckner, J. K. and Kim, H.-A. (2003): Urban sprawl and the property tax. International Tax and Public Finance 10 (1): 5-23.

Burchell, R. W., Lowenstein, G., Dolphin, W. R., Galley, C. C., Downs, A., Seskin, S., Gray Still, K. and Moore, T. (2002): Costs of sprawl - 2000. National Academy Press, Washington, DC.

Coase, R. H. (1937): The Nature of the Firm. Economica 4: 386-405.

Coase, R. H. (1960): The Problem of Social Cost. Journal of Law and Economics 3: 1-44.

Cohen, J. R. (2002): Maryland's "Smart Growth": Using incentives to combat sprawl. In: Squires, G. D. (Ed.): Urban sprawl: Causes consequences & policy response. Urban Institute Press, Washington, DC: 293-324.

Costello, C. and Polasky, S. (2004): Dynamic reserve site selection. Resource and Energy Economics 26 (2): 157-174.

Ellis, G. M. and Fisher, A. C. (1987): Valuing the Environment as Input. Journal of Environmental Management 25: 149-156.

Ewing, R., Schmid, T., Killingsworth, R., Zlot, A. and Raudenbush, S. (2003): Relationship between urban sprawl and physical activity, obesity and morbidity. American Journal of Health Promotion 18 (1): 47-57.

Falconer, K. (2000): Farm-level constraints on agri-environmental scheme participation: a transactional perspective. Journal of Rural Studies 16: 379-394.

Frece, J. W. (2005): Twenty lessons from Maryland's Smart Growth initiative. Vermont Journal of Environmental Law 6: 106-132.

Freeman, L. (2001): The effects of sprawl on neighborhood social ties. Journal of the American Planning Association 67 (1): 69-77.

Geoghegan, J. (2002): The value of open space in residential use. Land Use Policy 19: 91-98.

George, H. (1912): Progress and Poverty: An Inquiry into the Cause of Industrial Depressions and of Increase of Want with Increase of Wealth, The Remedy, (first published 1879). Doubleday, Page, & Co., Garden City, NY.

Gihring, T. A. (1999): Incentive property taxation: A potential tool for urban growth management. Journal of the American Planning Association 65 (1): 62-79.

Gillette, C. P. (2001): Regionalization and interlocal bargains. New York University Law Review 76 (1): 190-271.

Gordon, P. and Richardson, H. W. (2001): The sprawl debate: Let markets plan. The Journal of Federalism 31 (3): 131-149.

Häder, M. (1997): Umweltpolitische Instrumente und Neue Institutionenökonomik. Deutscher Universitätsverlag, Wiesbaden.

Hahn, R. W. (1986): Trade-offs in designing markets with multiple objectives. Journal of Environmental Economics and Management 13: 1-12.

Hansjürgens, B. and Fromm, O. (1996): Emission trading in theory and practice. An analysis of RECLAIM in Southern California. Environment and Planning C: Government and Policy 14: 367-384.

Krupnick, A. J., Oates, W. E. and Van de Verg, E. (1983): On marketable air-pollution permits: The case for a system of pollution offsets. Journal of Environmental Economics and Management 10 (3): 233-247.

McGartland, A. M. (1988): A comparison of air pollution permits: The case for a system of pollution offsets. Journal of Environmental Economics and Management 12: 207-228.

McGartland, A. M. and Oates, W. E. (1985): Marketable Permits for the Prevention of Environmental Deterioration. Journal of Environmental Economics and Management 12 (3): 207-228.

McKinney, M. L. (2006): Urbanization as a major cause of biotic homogenization. Biological Conservation 127 (3): 247-260.

Montgomery, D. W. (1972): Markets in licenses and efficient pollution control programs. Journal of Economic Theory 5 (3): 395-418.

Pasha, H. A. (1996): Suburban minimum lot zoning and spatial equilibrium. Journal of Urban Economics 40 (1): 1-12.

Paul, M. J. and Meyer, J. L. (2001): Streams in the urban landscape. Annual Review of Ecology and Systematics 32: 333-365.

Pendall, R. (1999): Do land-use controls cause sprawl? Environment and Planning B: Planning & Design 26 (4): 555-571.

Persky, J. and Kurban, H. (2003): Do federal spending and tax policies build cities or promote sprawl? Regional Science and Urban Economics 33 (3): 361-378.

Pigou, A. C. (1920): The Economics of Welfare. Macmillan, London.

Rothbard, M. N. (1997): The Logic of Action II: Applications and Criticism from the Austrian School. Edward Elgar, London.

Samuelson, P. A. (1954): The Pure Theory of Public Expenditure. Review of Economics and Statistics 36: 386-389.

Schultink, G., Memon, A. and Thomas, M. (2005): Land Use Planning and Growth Management: Comparative Policy Perspectives on Urban Sprawl and Future Open Space Preservation. East Lansing, MI.

Scott, M. J., Bilyard, G. R., Link, S. O., Ulibarri, C. A., Westerdahl, H. E., Ricci, P. F. and Seely, H. E. (1998): Valuation of ecological resources and functions. Environmental Management 22 (1): 49-68.

Swift, B. (2001): How Environmental Laws Work: An Analysis of the Utility Sector□ s Response to Regulation of Nitrogen Oxides and Sulfur Dioxide Under the Clean Air Act. Tulane Environmental Law Journal 14: 309-409.

Swift, B. (2004): Emissions Trading and Hot Spots: A Review of the Major Programs. Environment Reporter 35 (19): 1-16.

Thorsnes, P. and Simons, G. P. W. (1999): Letting the market preserve land: The case for a market-driven transfer of development rights program. Contemporary Economic Policy 17 (2): 256-266.

Tietenberg, T. (1985): Emissions Trading: An Exercise in Reforming Pollution Policy. Resources for the Future, Washington, DC.

Tietenberg, T. (1995): Tradable Permits for Pollution Control when Emission Location Matters: What Have We Learned? Environmental and Resource Economics 5 (2): 95-113.

Wassmer, R. W. and Boarnet, M. G. (2002): The benefits of growth. Urban Land Institute, Washington, DC.

Wätzold, F. and Drechsler, M. (2005): Spatially unifrom versus spatially heterogeneous compensation payments for biodiversity-enhancing land-use measures. Environmental and Resource Economics 31 (1): 73-93.

Whitby, M., Saunders, C. and Ray, C. (1998): The full cost of stewardship policies. In: Dabbert, S., Dubgaard, A., Slangen, L. and Whitby, M. (Eds.): The Economics of Landscape and Wildlife Conservation. CAB International, Oxon: 97-112.

Williamson, O. E. (1999): Public and private bureaucracies: a transaction cost economics perspective. Journal of Law, Economics and Organization 15 (1): 306-342.

Yang, X. and Lo, C. P. (2002): Using a time series of satellite imagery to detect land use and land cover changes in the Atlanta, Georgia metropolitan area. International Journal of Remote Sensing 23 (9): 1775-1798.

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