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Special Interest Groups and 4th Best Transport Pricing

by

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1. Introduction

Regulation economists are familiar with the distinction between 1st best and 2nd best pricing. 1st best means (social) marginal cost pricing and leads to maximum welfare. It is well known, however, that in the presence of economies of scale 1st best pricing may entail a deficit for the regulated firm. 2nd best takes this consideration into account and adds a cost recovery constraint to the welfare maximization problem. This leads to Ramsey-pricing rules or to two-part tariffs. In most cases implementation of such 2nd best pricing rules is informationally demanding. In most cases the regulated firm knows more about its demand and cost data than the regulator does and it may be costly to reduce this information asymmetry, even if sometimes the search for the corresponding demand elasticities can be decentralised to the regulated firms themselves (Laffont/Tirole 2000).

Economists therefore have added the categories of 3rd and 4th best pricing to 1st and 2nd best pricing rules (Vogelsang 2004, p.24). Third best pricing takes the informational problems into account that are involved in 2nd best pricing. The research connected with 3rd best pricing centred around incentive compatible regulatory mechanisms culminating in the work of Laffont/Tirole (1984). It is interpreted here, however, to include the idea that in view of information asymmetries it may be sensible in some cases to take recourse to simpler pricing rules than fully fledged Ramsey pricing or to apply a mix of pricing and command and control measures (like quantitative restrictions) to increase welfare.

3rd best pricing can also be defined to take metering costs and transaction costs into account as well as cognitive limitations of the part of consumers who may very well have difficulties

to understand highly differentiated pricing-schemes. Thus 3rd best pricing may be described as a kind of "realistic" 2nd best pricing.

4th best pricing moves even further in the direction of realism. 4th best pricing acknowledges that the regulation of prices never takes place in a political vacuum. Various interest groups will attempt to influence the level and the structure of prices in their favour. This may mean, however, that a certain pricing scheme which benevolent regulators or economists propose may look quite different after it has undergone the political process than it looked before. For instance, after having undergone the political process a proposed Ramsey tariff may still exhibit the Ramsey-structure but in reverse form (the less elastic demand gets a lower price-marginal-cost margin). This can be observed, for example, in many countries in the case of urban transit.

Taking this possibility of poltical manipulation of tariffs into account, it can be advisable to propose only tariffs whose structure makes them as little amenable to political influence as possible. This may mean, in turn, that tariff schemes which are known to be suboptimal in the sense of 1st , 2nd or 3rd best may nevertheless be 4th best. In a pioneering contribution Laffont (2000, Chapter 6) has shown, for example, that in this sense even a uniform tariff may be preferable to an optional (two-part) tariff structure.

It should be noted that the economic approach of 4th best pricing differs from two related approaches to regulatory pricing. The first approach is the psychological "acceptance" approach. This approach centers around cognitive limitations and psychological concepts of fairness that can decide the political fate of a proposed tariff-structure (e.g. Schade/Schlag 2003, Bonsall et al. 2004). A good example may be the pricing reform which the German railway (Deutsche Bahn AG) proposed in 2002 and which finally had to be withdrawn after heavy protests by users and substantial campaigning of the media (Wieland, et al. 2004). The second approach may be termed the "justice theory approach" (Glazer/Niskanen 2006, Zajac 1995). This approach deals with acceptance too but takes its departure from philosophical or economic theories of justice to explain why certain pricing structures (or even pricing at all) are not accepted by the public. There exists meanwhile a large theoretical and empirical literature on fairness or justice (see Konow 2003) of which the two approaches just mentioned may be seen as forming a part.

The 4th best approach, which is the subject of this paper, differs from these two approaches in that it remains within the boundaries of the classical economic model of utility maximizing agents. 4th best is in the tradition of a series of models that go back to the Stigler-Peltzman model of the positive theory of regulation (Stigler 1971, Peltzman 1976). It differs from these models, however, by considering less the *level* of tariffs but rather their *structure* and their amenability to the influence of interest groups via the political process.

This paper is organized as follows. In order to explain the basic idea of 4th best pricing more fully the following Section 2 will sketch and discuss the above mentioned Laffont model, where it is shown that under certain conditions a uniform tariff may be preferable to an optional tariff because such a uniform tariff is less amenable to the influence of interest groups. Section 3 will illustrate Laffont's insight with several examples from the transport sector. Section 4 will conclude.

2. Adam Smith's rule vs. Non-Linear Tariffs

It is well known that Adam Smith was one of the first advocates of road-pricing. In the "Wealth of Nations", Book V, Chapter I, Part III, he says this:

"It does not seem necessary that the expense of those public works should be from ….public revenue….. The greater part of such public works may easily be so managed, as to afford a particular revenue sufficient for defraying their own expense ……When the carriages which pass over a highway or bridge ….. pay toll in proportion to their weight or their tunnage, they pay for the maintenance of those publick works exactly in proportion to their wear and tear which they occasion of them." (Smith, 1776/1981, pages 724-725)

This means that Smith argues (a) for full cost recovery and (b) for a tariff proportional to marginal cost.

Let TC be the total cost of the road, let MC_i be the marginal cost of user-type i, q_i the quantity of infrastrucure services consumed by type i and let δ be constant factor. Let p_i denote the tariff for user i. Then the Smith rule says: choose δ such that

$$p_i = \delta\, MC_i \text{ and } TC = p_i\, q_i$$

In other words, the marginal cost which each user causes should be inflated by a constant mark-up δ, so that, in sum, total costs are covered. This rule has also been advocated by other economists, notably by Allais et al. (1965).

Smith's own arguments for this rule are basically of a public choice nature. It is impossible *not* to cite the following much quoted paragraph:

"A magnificent high road cannot be made through a desert country where there is little or no commerce, or merely because it happens to lead to the country villa of the intendant of the province, or that of some great lord to whom the intendant finds it convenient to make his court. A great bridge cannot be thrown over a river at a place where nobody passes, or merely to embellish the view from the windows of a neighbouring palace" (Smith 1776/1981, page 725).

But this argument is an argument for road-pricing in general. It is not an argument for the precise tariff-*structure* which Smith proposes, namely a linear tariff proportional to marginal-cost.

It is textbook wisdom that a tariff like this may cause substantial welfare losses and that these losses increase with the size of the fixed costs of the road. The textbook therefore proposes Ramsey-pricing or non-linear pricing schemes (like two-part tariffs or multi-part tariffs) as better alternatives.[1] Under favourable circumstances a two-part tariff may even amount to first-best pricing, if the fixed cost can be covered by the fixed component of the tariff and the variable component can be set equal to marginal cost. If information asymmetries concerning demand exist, these can be overcome by a suitably designed self-selecting menu of non-linear tariffs. Thus, in the textbook world the Smith rule is clearly inferior to an appropriately designed menu of two part tariffs. Laffont (2000, Chapter 6) shows, however, that this result is turned on its head when one takes the influence of special interest groups into account.

In order to obtain this result Laffont assumes an economy which is composed of two groups which derive utility from the output of a natural monopoly (a railway network, perhaps, or a

[1] In principle, two part tariffs can be regarded as a special form of Ramsey pricing.

motorway-system). Group 1 derives utility S(q), group 2 derives utility βS(q), where β>1. Thus, group 2 derives systematically more utility from the output of the natural monopoly than group 1. β can be regarded as a parameter measuring the "heterogeneity" of the two groups. The important point now is that these two groups may alternate in power with a certain probability. The group in power then has to decide on the production level of the natural monopoly and the financing scheme. When group 1 is in power it will take decisions (within constitutional limits) which maximize its own welfare. Group 2 must accept the decisions taken by group 1 so that the welfare of group 2 is a function of the decisions taken by group 1. Likewise, group 2 will maximize its own welfare when the reverse situation arises. Total welfare in the economy is therefore *expected* total welfare with the precise value depending on the probabilities with which the two groups are in power.

It is clear that within this framework each group will try to shift the financial burden of its consumption to the other group.

Laffont now compares two situations. In the first situation the Smith rule has been laid down as the relevant pricing principle in the country's constitution. In the second situation 2nd degree price discrimination is incorporated in the constitution. In both cases this means that the *structure* of the financing scheme cannot be changed any more only the level of its various components.

Let the Smith rule be considered first. In the case of the Smith rule the group in power can decide on the production level of the natural monopoly and thereby on the level of the mark-up δ.

Let the cost function of the natural monopoly be the linear affine cost function

$$C(q_1,q_2,\ldots,q_n) = \Sigma c_i q_i + F,$$

with c_i being the marginal cost for serving user type i.

Cost recovery requires

$$\Sigma p_i q_i = \Sigma \delta c_i q_i = \Sigma c_i q_i + F$$

This entails

$$\delta = 1 + F/\Sigma c_i q_i$$

so that δ is a function of the q_i. Therefore, if the group in power prefers a higher production level than the minority then δ will be lower. It is important for the following to note, however, that the distortion created by δ will always affect the consumption level q of both groups.

In the second situation which Laffont considers 2nd degree price discrimination is laid down in the constitution as the financing scheme. The constitution specifies that the groups can choose between two two-part tariffs (T_1,q_1) and $T_2,q_2)$[2] but it says nothing about the numerical *levels* of these tariffs. But this means that the group in power has room to manipulate the two tariffs in such a fashion that it obtains a larger share of the total utility and a smaller share of the financial burden than the minority. In doing so the majority must respect the incentive constraints, of course, so that each group chooses the "right" tariff, but nevertheless there is room to redistribute welfare and costs in its favour.

Let $S(q_i)$ denote welfare of group i and q_i consumption of the good produced by the natural monopoly. Then the two self-selection constraints for both groups are:

$$S(q_1) - T_1 \geq S(q_2) - T_1$$

$$\beta S(q_2) - T_2 \geq \beta S(q_1) - T_1$$

Laffont assumes that the valuation of the good in question is so high that the two individual rationality constraints

$$\beta S(q_1) - T_1 \geq 0 \text{ and } \beta S(q_2) - T_2 \geq 0$$

are always satisfied. This means that when group i happens to be in power and is maximizing its own welfare the self-selection constraint of the other group j must be binding.

[2] As is common in the literature on 2nd degree price-discrmininations (T,q) denotes a two-part tariff where total payment T is reqired to obtain the amount q of the good in question.

In addition, there is the cost recovery constraint:

$$\alpha T_1 + (1-\alpha)T_2 = c\,(\alpha q_1 + (1-\alpha)q_2) + F$$

where α denotes the share of group 1 in the total population in the economy.

If group 1 is in power it will choose quantitiy q_{11} and tariff T_{11} to solve:

$$\max a^* (S(q_{11}-T_{11})$$

subject to the just mentioned constraints. When group 2 is in power it will solve

$$\max a^* (S(q_{22} - T_{22})$$

subject to the same constraints. Here a* denotes the particular value that α takes with probability π.

Laffont compares expected welfare when (a) the Smith rule is embodied in the constitution and (b) when 2nd degree price discrimination is embodied in the constitution. It was said already that compared to the welfare optimal quantities q_1^* and q_2^* the Smith rule distorts both consumption levels. In contrast, 2nd degree price discrimination only induces a (voluntary) distortion for the group that happens to be in power.[3] The other group consumes the efficient amount but at a substantially reduced welfare. The majority group can increase its own welfare by consuming less than is optimal (in the case of a majority for group 1) or more than is optimal (in the case of a majority for group 2) and thereby reduce welfare and increase the financial burden of the other group.

From what was said so far it should be plausible that the Smith rule causes less distortions of expected welfare than second degree price-discrimination. With the Smith rule, manipulation of the majority is reduced to setting the level of its own consumption q_i , whereas under price-discrimination the majority has substantial room to influence the distribution of welfare and

[3] This is similar to the standard result in 2nd degree price discrimination where the low-demand user consumes an inefficintly small amount of the good and the high-demand user conumes the socially optimal amount.

financial burdens in its favour. Still, it is not true that the Smith rule is *always* better than second degree price discrimination. As can be expected, the Smith rule's welfare performance decreases the higher the fixed costs. After a certain point second degree price discriminiation outperforms the Smith rule.

The relative performance of the two pricing systems also depends on the heterogeneity β of the two groups. The higher the degree of heterogeneity the more incentive exists for the majority to price-discriminate in its favour. Therefore second degree price discrimination becomes worse compared to the Smith rule the higher the degree of heterogeneity.

In the remainder of his contribution Laffont also compares the Smith rule to other pricing rules like the Hotelling rule (marginal cost pricing plus a public subsidy to cover the deficit). He is always able to identify parameter constellations under which the Smith rule is superior. Unfortunately, like in the just described case of 2^{nd} degree price discrimination, it seems difficult to translate these mathematical conditions into real world cases. All that seems possible are "tendency" results of the form: "when parameters x,y,z take high values the A-rule is likely to be better as a constitutional principle than the B-rule". The policy maker therefore is still faced with the difficulty to decide whether a certain parameter constellation applies in a given practical case or not.

Other considerations too advise caution in interpreting Laffont's results. They are based on a highly stylized model in which there are only two interest groups in the economy. In addition, there is only one political issue at stake, namely tariff setting for one single infrastrucure monopoly. Thus, there are no problems of "vote trading", log-rolling etc. Furthermore, there is no political context in which the two groups have to act: There are no politicians and no institutions. Still, the model conveys a very important message: It is important to take aspects of political economy into account when one designs regulatory pricing-propsals. If one disregards this message one may very well generate welfare results which are the opposite of what one intended. Thus, Laffont is certainly right, when he concludes:

"… a political economy of pricing is required. Clearly, the various pricing rules are sensitive to different types of political influence and a complete theory should consider, in each policy case, the most relevant dimensions of discretion. The policy conclusions will certainly be country- and industry- specific, since they, broadly speaking, trade off the inefficiencies of the

pricing rules which derive from marginal cost pricing or Ramsey pricing and the political distortions they are associated with." (Laffont, loc. cit., p. 138).

In the following section a few examples taken from transportation will be examined which show the practical relevance of this view.

3. Special Interest Groups and Transport Pricing: Examples

3.1. The German Rail Access Charges System of 1998

In 1994 the German railway system underwent a major reform. The railroad sector was opened to competition and the dominant operator DB was forced to open its network to competitors at published conditions of access and at published prices. The DB accordingly designed a system of access charges (called TPS 98) that basically was an optional tariff. Network users could choose from two otions: 1) a linear tariff based on the length of the slot required (measured in kilometers) and 2) a two-part-tariff. The first option was called "Variopreis" and the second option "Infracard". In introducing this system the DB relied heavily on economists' advice.

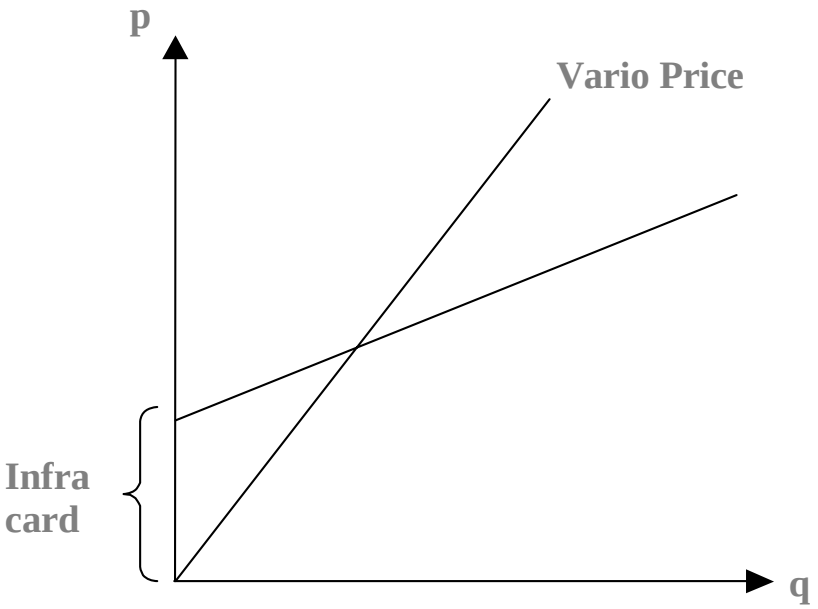

Figure 1: TPS 98

This tariff-system, however, lead to complaints before the Federal Cartel Office. The argument was basically that the Infracard amounted to a high discount for the DB and therefore constituted an unjustified competitive advantage for the dominant operator DB over the smaller competitors for whom it was more economical to use the Vario Price.

In its decision in this matter the Federal Cartel Office accepted the arguments of the complainants and forced the DB to withdraw TPS 98. In its judgement, however, the Cartel Office stated that it was not against an optional tariff of this kind *per se*. The reason for the decision was rather to be seen in the degree of the degression of average price that the Infracard implied.

This means that, in principle, the DB could have reacted to the Cartel Office's decision by maintaining the optional tariff but by revising the two-part tariff in such a way that the price degession was somewhat reduced. The DB, however, chose a different course of action. Instead of maintaining the option between a linear and a two-part tariff the DB introduced a basically linear tariff (named TPS 2001), not unlike the Smith tariff described in the last section of this paper. There are certain mark-ups on this linear tariff according to e.g. speed, priority and technical quality parameters and there are also rudimentary elements of peak-load pricing in the system. But basically TPS 2001 is a linear tariff based on average cost.

TPS 2001 was followed in 2003 by TPS 2003 which, however, contains only slight modifications and which is the system in force today. Ever since TPS 2001 has been introduced there have been no complaints by the competitors of DB even though more price-differentiation (perhaps of the TPS 98 type) is still advocated by economists.

This case is certainly not a one-to-one confirmation of the Laffont model described in the last section. In particular, in this case it is inputs that are at stake in this case, not final outputs. It has been shown by Ordover and Willig (1982) that for inputs two-part tariffs may not be strictly superior to linear prices. Therefore the welfare conclusions from Laffont's model are not necessarily transferable to this case. Nevertheless, the case shows, that the Cartel Office and DB's competitors believed that DB had manipulated the two-part tariff in its favor. After introduction of the average-cost based tariff these complaints have subsided. [4,5] Incidentally,

[4] There are controversies, however, concerning the so-called "regional factors" which are surcharges or discounts according to a regional network's capacity utilization. These controversies, however, are largely a

the chairman of DB is reported to have introduced this average cost based tariff (instead of a milder version of the two-part tariff) because he was tired of seing the DB being constantly accused of anticompetitive practices. Thus TPS 2003 seems to be optimal from the view of 4th best pricing though not from the viewpoint of 1st-3rd best pricing.

3.2. The German HGV-toll

Since January 2005 Heavy Goods Vehicles (HGVs) pay a toll on German motorways. The HGV toll is based on the German road cost allocation scheme (Wegekostenrechnung) which is basically a fully distributed cost methodology.[6] This methodology identifies those fixed costs of the motorway system which are "caused" by HGVs (or – in a newer version based on Shapley-values - which "should" be attributed to HGVs). The toll is differentiated according to axle-weights and emission classes. Private cars are not included in this tolling system and can use the motorways "for free". (They contribute to the financing, of course, through gasoline taxes.) This state of affairs can be seen as a kind of price discrimination where car-drivers pay a price of zero whereas truckers pay an average cost price (based on the part of total costs which they are "causing").

The acceptability of the HGV toll in Germany is high. There were very little political difficulties in introducing the system. (The main problems were technical and managerial problems on the part of the toll system operator which gained an enormous amount of media coverage.) Politicians favoured the scheme because they foresaw it would help to mitigate the substantial budgetary problems that infrastructure financing is plagued with in Germany. The trucking industry accepted it (grudgingly) because it reduces the competive disadvantage of German hauliers versus the other European hauliers. Car drivers liked it because they believed that there would be less congestion on the motorways and the public at large is still convinced that the truck is the main cause of environmental and congestion problems. Thus there was (and still is) "a grand coalition" in favour of the HGV toll. (For details see Wieland, 2005.)

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matter between the regional public transport authorities, who have to pay these factors, and the network operator, DB Netz. They are not controversies between DB and its competitors.

[5] Rothengatter (2003), p.128, however, reports complaints of the Karlsruhe Regional Transit Company and other regional transit companies that the new system discourages the companies to lease large amounts of slots from the network operator. The Karlsruhe firm has reduced its frequency and now employs three-car trains instead of two-car trains. The welfare loss is carried by the customers, of course.

[6] The methodology is described in Kommission Verkehrsinfrastrukturfinanzierung (2000) and in its revised form in Rommerskirchen, S. et al. (2002)

From the viewpoint of normative economics it is not clear that Germany's existing "price differentiation" between trucks and cars is justified. There is currently a lively debate in Germany whether a toll for pricvate cars should be introduced or not. (For two contrasting views see e.g. Wissenschaftlicher Beirat 2005, Baum 2005). From the point of view of this paper it is not necessary to enter in this debate. What matters here are the political economy aspects of the situation. In fact, the situation seems to be comparable to the framework of the Laffont model. To see this, it must first be said that the toll in Germany is a financial burden that is levied by the state "on top" of the existing gasoline taxes.[7] The toll has the aim to fill the financial gap between investment needs and the actual budget that is allocated to the motorway infrastructure. It is if no relevance here that, in principle, the current level of gasoline tax revenues would be sufficient to cover all motorway costs. In reality a large share of the gasoline-tax revenues is used for non-road purposes. All that matters therefore is, how the financing of the existing gap between road infrastrucure costs and actual spending is shared between car-users and non-car-users. At present it seems that car drivers use their political power to increase their welfare at the expense of non-car users and of truckers insofar as they contribute nothing to this gap. German truckers face stiff competition from abroad, notably the new EU members, and therefore cannot easily pass the toll on to shippers. Therefore German truckers certainly bear a substantial amount of the welfare loss. Non-car users too participate in financing the gap. It is estimated that currently price effects of the German HGV toll are under 1%. In the case of consumer goods the price effects are estimated to be substantially lower, namely around 0,2% (Aberle 2006). Car-users, of course, have to bear these price-increases too but their welfare is reduced to a lesser degree insofar as they profit from less congestion on motorways. (These judgements are fairly rough, of course. To the knowledge of this author there is no scientific welfare analysis of the German HGV toll up to now.)

It is an interesting research question what would happen (from a welfare point of view) if the zero-toll for private cars would be abolished. It seems that from a political point of view there are four basic options available for structuring a toll that would cover both private cars and HGVs:

[7] There had been plans to lower gasoline taxes for German HGVs as a compensation measure but the main purpose of these plans was to eliminate competitive fiscal disadvantages of German truckers vis a vis their European competitors. For the moment, these plans, have been stopped by the European Commission.

(a) The Smith tariff as described in Section 2 above. Here all types of cars and HGVs would pay in proportion to the marginal cost they cause.
(b) Two differing linear prices, one for cars and one for HGVs, calculated according to the existing German fully distributed cost methodology.
(c) A system of multi-part tariffs, differing, perhaps, between cars and trucks and low and high users.
(d) A system of differentiated tolls according to elasticities.

All four solutions could be further differentiated, of course, to include peak-load elements, etc.

Taking Laffont's analysis above into account, it seems likely that car users would employ their political power in subsequent "adjustment rounds" of the toll-system to influence the tariff structures (b), (c) and (d) in such a way as to shift a relatively larger share of the financial burden to trucks. It may therefore be the case that something like the Smith rule would be more advisable. But this is an open research question.

3.3. The EU-Discussion about Infrastructure Pricing

Until recently the EU-Commission has been a strong proponent of social marginal cost pricing in the field of infrastructure charging. The Commission stated its adherence to this principle most clearly in its White Paper "Fair and Efficient Pricing of the Transport Infrastructure" issued in 1998. The White Paper, however, was criticized on this point by several well-known transportation economists (e.g. Rothengatter 2003, Wissenschaftlicher Beirat 1999). With Directive 2001/14 which is part of the so called "first railway package" the commission took first steps towards implementing pricing according to short run marginal cost as the fundamental pricing rule (at least in railways). It seems, however, that in the very same directive the Commission has already somewhat weakened this principle by granting exceptions. In Article 8, Nr. 1, of the Directive, for example, one finds the following sentence: "In order to obtain full recovery of the costs incurred by the infrastructure manager a Member State may, if the market can bear this, levy mark-ups…". This sounds more like pricing according to elasticities rather than according to short-run marginal costs. The Commission's last White Paper "European Transport Policy for 2010: Time to Decide" (2001) introduces the

notion of "marginal cost *based* pricing". This, however, amounts to a major change because there are many pricing systems which are *based* on marginal cost[8] Marginal cost based pricing is compatible with several pricing rules. It is compatible with the Smith rule (prices proportional to marginal cost), Ramsey-pricing, and two-part tariffs. Commission paper IP/03/1097 (2003) even goes one step further and allows for cross-subsidies by stating that "cross financing of infrastructure construction in sensitive areas" is permissible.

In the revised version (COM (2003) 448 final) of the so-called "Eurovignette-Directive" (1999/62/EC) no mention is made of marginal cost pricing. Rather it is stated in Section II, 1., of the Explanatory Memorandum that road user charges should "reflect" the following costs: "the cost of damage to the infrastructure and the investment costs (construction cost including, where appropriate, interest on the invested capital)". "The cost of damage includes occasional structural maintenance, such as renewal of the surface, and regular annual maintenance, such as road marking and winter maintenance." Two paragraphs later it is stated that the costs of structural maintenance are proportional to the damage caused by the traffic, which, in turn, is a function of axle-weight.

Like in the case of rail it seems that all types of fully distributed cost pricing and multi-part tariffs are compatible with these postulates. In Section II, 2 the scope of feasible pricing rules is widened even more. Here differentiation according to distance traveled, place, infrastructure type, vehicle characteristics, time of day and congestion level are allowed. One may safely conclude therefore that systems of peak-load pricing, congestion pricing and Ramsey-pricing are allowed. It seems therefore that the Commission puts more emphasis now on price differentiation as a means to finance transport infrastructure.

Conversations with Commission officials seem to indicate that meanwhile the Commission is seeking for a completely new approach to infrastructure pricing. To a large degree this is probably due to conflicting interests between peripheral and centrally located members of the European Union. Whereas a country like Germany insists on full cost-coverage peripheral countries see this as putting them into a situation of competitive disadvantage. These countries prefer marginal cost-pricing. It is well known from the theoretical literature, of course, that under certain conditions pricing and investing according to short-run marginal

[8] „Marginal Cost Based pricing " is also the title of a well-known paper by Eric Verhoef (2002), first presented at the 2nd IMPRINT Seminar, which may have been influential in influencing the Commission's change of language.

cost will lead to cost coverage (Mohring/Harwitz 1962, Verhoef 1996). Among these preconditions are constant economies of scale in road building and choice of optimal capacity. From a political economy point of view it is particularly the second assumption that is unlikely to apply in reality. Infrastructure building is a political process that is highly characterized by rent-seeking activities and logrolling of local interest groups and politicians.

In view of the Laffont model discussed above it seems that we can cast the problem of EU infrastructure pricing as a conflict between two groups again, namely the peripheral EU-members and the centrally located member states. Both derive welfare from the existence of a well-developed transport infrastructure. The question is how these welfare gains and the financial burden between these two groups of countries will be allocated. It seems to conform very well to the Laffont model that the EU member countries are pressuring the Commission to resolve this political dilemma via price differentiation. But this solution may be counterproductive (from a welfare point of view).

In the language of Laffont's model the commission is currently in the process of deciding which basic infrastructure pricing rule should be implemented at the "constitutional level" of EU transport policy-making. There can be no doubt that the fixed costs of transport infrastructure are high. This puts the Smith rule at a disadvantage and favours price differentiation. However, heterogeneity seems to be high too, which favours the Smith rule. Again, the resolution of this dilemma must be left to future research.

3.4. The symbolic Use of Price-Differentiation: Noise Charges at Hamburg-Airport

Political scientists are familiar with the notion of the "symbolic use of politics". This concept does not fit well into the worldview of economists because it refers to policy making which is explicitly designed to have no economic effect at all. As such it also does not fit into the framework of models of the Laffont type. The case of the differentiation of landing fees at Hamburg Airport, however, seems to show that the symbolic use of politics exists and that price differentiation can be an instrument of such a type of policy making.

It is important to note that Hamburg airport differs in one important aspect from all the other airports that are currently discussed in the airport economics literature: Hamburg airport has

currently no capacity problems. Hamburg is one of the so-called secondary airports in Germany that actively tries to attract customers. It is possible, however, that in the future Hamburg might be confronted with capacity problems due to increasing trade between Northern Germany and the Scandinavian counties, the Baltic Sea countries and Russia. Notwithstanding the fact that Hamburg is a secondary airport its market power is still considered to be great enough to merit price regulation and it is therefore subject to price-cap regulation (dual till) in the form of the average revenue approach. In applying this particular form of price-capping, the city of Hamburg is a pioneer in Germany.

Differentiation of landing-fees in Hamburg occurs mainly with respect to noise emission. The aim is to encourage airlines to use less noisy planes. There are seven different noise categories and Hamburg does its own noise measuring. Landing fees are differentiated according to the seven noise categories and in addition there is a surcharge on these tariffs during nighttime. From 22:00 to 22.59 the surcharge amounts to 100%; from 23:00 to 5:59 in the morning the surcharge amounts to 200%.

The differentiation of landing fees according to noise at Hamburg Airport and the installation of own noise measuring systems must be seen as a reaction to political pressure on the part of environmentalists and citizens living close to the airport. In 2001 a new city council had to be elected and airport noise was on the political agenda. Shortly before the elections to the city council noise charges were separated from the other airport charges to make them more visible to outsiders.

Preliminary statistical analysis of the effect of noise charges at Hamburg airport on the choice of aircraft type reveals that this effect seems to be nil (Wylensek, 2006). This is hardly surprising for a variety of reasons. First, the level of these charges is low amounting only to a small percentage of total airport fees. For example, for a Boeing 737-300 noise charges amount to 4-5% of total landing fees at Hamburg. Second, there is a worldwide trend for airlines to use less noisy planes (at least in the developed countries). Both arguments suggest that there was basically no necessity for politicians and airport managers in Hamburg to develop a highly differentiated system of noise charges. Nevertheless, the system was put in place and political protests by affected citizens and environmentalists subsided. Thus it seems that Hamburg airport has used tariff differentiation as a special variety of the symbolic use of politics.

An alternative way to explain the case of Hamburg airport's noise charges – and one which fits better into the economist's way of thinking - is to employ the notion of regulatory capture. It has to be remembered that the positive theory of regulation took its departure from a very similar empirical finding by Stigler and Friedland in 1962. The authors showed that the empirical effect on price-regulation in the electricity industry was practically nil. Thus, it can be contended that the regulators of Hamburg airport were really acting in the interest of the airport, the airlines and their customers at the expense of local citizens. In other words, regulators were "captured" by producers and air travelers.

The counterargument against this view is that the standard result of the Stigler-Peltzman model shows at least *some* concession to consumers, the precise amount of this concession being dependent on the curvature of the voting function, which is in the center of the Stigler-Peltzman model. An empirical result that shows absolutely no favorable effect on the local citizens seems to be difficult to reconcile with this type of analysis.

I conclude therefore that the explanation of the symbolic use of tariff-differentiation to reconcile political conflicts has some plausibility.

3.5. A selection of further examples

There are many more examples than those just mentioned to demonstrate the importance of a political economy of transport pricing.

In the railroad sector value of service pricing has always been a favourite pricing policy. The basic principle is to charge a high tariff to high valued goods (mainly manufactured goods) and a low tariff to low valued goods (like agricultural products). Value of service pricing was explicitly introduced by the ICC shortly after its creation in 1887. Under regulation value of service pricing can be regarded as a form of Ramsey pricing. At the same time, however, it allowed the ICC to strike a compromise between the interests of the farmers and the railroads, which formed a small but well organized and powerful interest group. At that time this conflict of interest existed not only in the USA but almost everywhere. Therefore one may conjecture that the wide application of value of service pricing in the railroad sector almost all

over the world derives from the political economy features of this type of tariff differentiation. (For the United States a well known analysis along this line was conducted by Keeler 1984.)

Another example of political pricing is furnished by urban public transit in most countries. In most countries ticket prices for urban transit exhibit the structure of "inverse Ramsey pricing". Low elasticity users (like morning commuters) face a low price instead of a high one. In economic theory this can be justified if there are high external effects. If external effects are included in the Ramsey formula they may turn the result around (Laffont/Tirole, loc. cit.). But it is far from clear whether these positive external effects really exist and whether they achieve this magnitude. It seems far more plausible to assume political influence behind this rate structure.

There is another example, which fits very well to this case of inverse Ramsey pricing. In 2002 the German railway (DB AG) tried to introduce a new system for its passenger operations. This system attempted to replace the existing kilometre based flat rate with a type of elasticity based pricing, not unlike the yield-management approach employed by the airlines. It contained peak-load elements and advanced booking discounts. However, due to substantial political resistance by the public and negative coverage in the media this system had to be withdrawn. (For an in-depth description of this case see EU-project TIPP, Deliverable 4). Although the system could be considered to be third best in the above classification it was not fourth best.

4. Conclusions

This paper has argued for putting the analysis of Fourth-Best Pricing high on the current research agenda of transportation pricing. Two types of research seem to be called for in this area.

First, there should be theoretical analyses of the Laffont type described in Section 2 of this paper. The Laffont model, brilliant as it may be, clearly is too stylized to be applicable to the variety of pricing issues that arise in reality. The most promising direction of research seems to include pricing issues more explicitly into the theory of interest groups (Grossman,

Helpman 2001). The ultimate aim would be to arrive at a positive theory of infrastructure pricing.

The second type of research is empirical. It should identify interesting empirical cases and develop testable (or at least checkable) hypotheses about the political economy of pricing. If successful, this research may allow to recognize empirical regularities and patterns The following (still somewhat vague) hypotheses may give a flavor of the type of hypotheses that could be developed in this direction of research:

- The likelihood for political manipulation of infrastructure charges raises with increasing complexity.
- Often it is just the desire to reach a political compromise, which is the reason for price differentiation.
- Price differentiation, which increases welfare and at the same time, hurts none of the major interest groups will always be implemented. (This hypothesis goes back to Keeler 1984.) Where a large block of common cost exists differentiation of infrastructure charges reflects the cost allocation of the interest groups.and others

The political relevance of this research should be obvious. If successful, research along these lines should be able to answer questions like the following:

- Which kind of tariff structures are most amenable to political manipulation by interest groups and should therefore be avoided even though they may be desirable from the view of 1stBest, 2nd best or 3rd best? (I, personally, would not be surprised if some of the existing pricing schemes turn out to be quite reasonable from this perspective.)
- What institutional action should be implemented in order to prevent political manipulation?

Laffont formulated the essence of this research agenda in one sentence: “By suggesting constitutional rules which decrease the discretion of politicians even at the cost of some efficiency losses, economists can enhance expected social welfare.” (Laffont, loc. cit., p.150). For Europeans (but not only for Europeans) The apparent reorientation of the EU-Commission’s basic philosophy to infrastructure pricing seems to be a good occasion to take up this challenge.

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