INCENTIVES FOR DEREGULATION: AN ECONOMIC CALCULUS

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One of the most important characteristics of the transportation sector is the high level of government intervention via regulation. In various transportation markets prices are not determined by market forces (demand-supply) but by way regulation policy of the government.

The consequence of economic regulation is a partial or full suppression of the price mechanism. It can be considered an attempt by the government to change the allocation of resources and the income distribution, apart from what happens when the market would not be submitted to such a regulation.

Transport economic research has recently been about the discussion regulation versus deregulation. Partisans of regulation especially refer to the existence of scale economies, but also of density economies. The average costs decline, if not with the size of the organisation,then with the traffic volume on the network. To this, we can also link the problem of destructive competition for both the road transportation and the inland navigation sector, because these sectors are composed of small companies with a high ratio between fixed and total costs. Firms with such a cost structure are willing to go on working with short-term losses to maintain their capital stock (McRae and Prescott, 1982, p. 3).

Those who are in favour of a complete deregulation start from the relatively low capital requirements and state that nothing in the technological structure points to the existence of barriers to entry and economies of scale. The haulage sector for instance would be competitively organised in the absence of regulation, with many small firms all operating at the minimum point of their average cost curve (Friedlaender and Spady, 1979, p. 169).

The purpose of our paper is to examine the economic cost of regulation, with a quantitative application to the goods transportation in Belgium. Indeed, this economic cost corresponds with a benefit of deregulation.

Although the empirical application of this paper concerns an

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economic calculus for the Belgian goods transportation sector, we can affirm that the approach is also usable for other countries. To make the paper attractive and understandable to every reader we will first give a brief overview of the state of the art concerning regulation in Belgium. At the same time we will examine whether the conditions for successful regulation exist: large external benefits and costs, large costs not assignable to specific sales units, monopolistic industries, low administration costs. If only some of these conditions exist, the possibility of successful economic regulation will decrease.

In a last section we will estimate the economic loss or cost of economic regulation, using available empirical results of econometric models concerning the Belgian goods transportation sector.

1. ECONOMIC REGULATION IN BELGIUM: PRESENT SITUATION

1.1. Truck transportation

Private transport is regulated in the sense that a company is allowed to transport only their own products, i.e. it is not allowed to accept a backhaul for a third company. As such the entry to the market is economically completely free and price regulation is totally redundant.

The following survey of regulation in the truck transportation sector only concerns transport by specialised firms.

1.1.1. Price regulation

In Belgium two tariff systems were used; reference tariffs and compulsory tariffs. Since 1/1/1989 compulsory tariffs have no longer been imposed. Reference tariffs only have an informative value for the parties interested and are not obliged. The only aim is to contribute towards the transparency of the market. The factors to calculate the tariffs are the tariff distance, the tariff class and the pay-load.

The determination of prices for transportation between E.E.C.-countries is based on a system of reference tariffs. Two or more E.E.C.-countries can decide, by mutual arrangement, to introduce obligatory tariffs instead of reference tariffs. However, the E.E.C. is negotiating a complete liberation of the prices starting from 1/1/1990.

1.1.2. Entry regulation

A distinction has to be made between the entry into the business of commodity transport and the entry into the market.

The entry into the business is regulated by a E.E.C. guide-line. The main principles of this guide-line are reliability, financial strength and professional skill. The entry into the market is regulated by the national legislation. It involves three (consecutive) authorisations: the transportation certificate (for transportation within a radius of 50 kilometres), the licence for national transportation, the licence for international transportation.

Gradually some liberalisations were introduced, especially at the level of Benelux, the E.E.C. and the E.C.M.T. (European Conference of Ministers of Transport).

1.2. Inland navigation

As in most E.E.C.-countries the Belgian inland navigation sector is submitted to a market regulation in which elements of price and entry regulation are mixed. Belgium has different systems with respect to national or international transportation.

1.2.1. Inland transportation

Inland transportation is controlled by the "Dienst voor Regulering van de Binnenvaart" (DRB), the regulatory agency. The conclusion of transportation contracts is based on a rotation system. After executing a transportation task a bargeman has to go to one of the DRB-offices to take a new enrollment. Freight is allocated in rotation.

The compulsory tariffs and the chartering conditions are fixed by the government, on the advice of both transporters and users.

1.2.2. International transportation

Transport to and from foreign countries is essentially free, except the link with France and the Netherlands.

The rotation system combined with a system of floor tariffs is applied to the transportation between Belgium and France, with the exception of the Rhine traffic. For the transportation between Belgium and the Netherlands there exists a privately organised rotation system combined with unofficial floor tariffs.

The remaining international transportation, including transit, is completely free.

1.3. Rail transportation

Important obligations are imposed to the railway company by the government, especially in the passenger transportation sector, e.g. the obligation to transport everyone at a published tariff.

Concerning commodity transport the railway company has much more freedom. In some cases individual contracts can be concluded and it is even possible to refuse some transportation. Furthermore, the railway company no longer is obliged to transport at previously fixed and published tariffs. On the contrary, the majority of the commodity transport is carried out with special contracts.

2. SUCCESSFUL REGULATION

In this section we will analyse whether the Belgian commodity transportation sector possesses the characteristic features that make it desirable to regulate on pure economic grounds. As long as no other important social goals are adversely affected, regulation is successful if we can improve the economic performance.

Wilson (1980, pp. 173-176) considers four conditions for successful regulation. Successively we will briefly consider whether the Belgian commodity transportation industry has large external benefits and costs, high fixed or joint costs, and whether the industry is "monopolistic" because of e.g. economies of scale. The administration costs of the regulation process itself will be considered in a further section.

2.1. Large external benefits and costs

Also in Belgium the provision of transport involves external effects (air-pollution, noise, congestion,...). Though these external effects are not important enough to necessitate price regulation. If there exists negative external effects, the gap between the marginal social costs and the marginal private costs can be closed by way of an efficient taxation. Therefore, economic regulation is not strictly necessary.

This paper only concerns the question whether there are reasons for price- and capacity regulation. We will not discuss further the problem of taxation of external effects.

2.2. High fixed and/or joint costs

High fixed and/or joint costs often are not immediately assignable to separate performances. Wilson (1980) argues that this could be a reason for regulation. Marginal cost pricing, in this opinion, would leave a deficit.

As such the argument is not correct. It is well known that marginal cost pricing results in a deficit, only in the presence of scale economies.

It is quite possible for high fixed costs to occur in an industry with diseconomies of scale, low fixed costs to be combined with economies of scale. The correct point to investigate is therefore not the share of fixed costs, but the effect of output on average cost.

2.3. Scale economies

Scale economies correspond with decreasing marginal costs, i.e. decreasing average costs in the section in which the market demand is cut. The market mechanism does not lead to an efficient allocation of resources. Indeed, to produce at the lowest possible costs requires the existence of only one producer. This producer will try to produce at the point where marginal revenues and marginal costs are equal, with a price above marginal costs. For a better function of the market the government can indeed regulate the price of the only producer (1).

The question can be put in what way the traditional Belgian modes are subject to scale effects.

2.3.1. Inland navigation

In our econometric cost model of the Belgian inland navigation sector the coefficient estimated for the output variable indicated significant scale diseconomies (Van de Voorde, 1985, p. 166). This empirical result contrasts with earlier studies of Case & Lave (1970) and Polak & Koshal (1976), both pointing out scale economies for American inland navigation.

2.3.2. Rail transportation

A translog cost function was estimated for the Belgian State Railway Company (Van de Voorde, 1985, 1986). The empirical results

(1) Scale economies will not be such a problem if the market is contestable.

indicated that there are no density economies if an increase in the separate outputs (commodity transport, passenger transport) is considered. When both outputs are considered together, density economies only appear after a certain threshold: the average costs increase until a certain output level; afterwards they start decreasing.

2.3.3. Road transportation

Until now no reliable and significant estimates of the scale- and/or density economies have been made for the Belgian trucking industry. Anyhow, the market structure gives an important indication.

Scale economies correspond with marginal costs below the average costs, and a market tending to a structure with one great company. Table 1, however, shows that the haulage sector consists of more than 7000 companies of varying size. Starting from the relative low capital requirements, it can be expected that the haulage sector is characterised by constant costs and many small firms operating at the minimum of their average cost curve.

Table 1: Belgian haulage sector (number of companies)

Size	1986	
	number	%
Small companies (1-4 trucks)	5469	70.0
Medium sized comp. (5-20 trucks)	1696	21.7
Large companies ($\geq$ 21 trucks)	647	8.3

Source: IWT

In the short run the concept of scale economies does not justify the introduction of regulation in the inland navigation and the trucking industry, but may do so in rail transportation.

2.4. Successful regulation: a doubtful answer

Do the conditions for successful regulation exist in the Belgian commodity transport sector?

The answer is uncertain. Undoubtedly there are external effects, but therefore an efficient taxation seems more plausible than economic regulation. High fixed and/or joint costs are not necessary a reason for government regulation. There are no scale or density economies in the trucking industry and the inland navigation, only limited density economies in rail transportation.

There is no uniform answer concerning the conditions for successful regulation. Awaiting further empirical research it seems very interesting to go into a number of costs that are attended with regulation.

3. THE COST OF ADVERSE REGULATION

Wilson (1980, p. 236) distinguishes five main areas where economic regulation may or does cause costs to society:
- the process of regulating itself;
- the misallocation of resources as a result of regulation keeping freight rates above marginal cost, the "deadweight loss";
- the economic loss caused by the excess capacity resulting from regulation;
- the shift of traffic from low- to high-cost modes because of rate regulation preventing rates from reflecting relative costs;
- the influence on technological change.

A possible working-method consists in estimating the economic loss or cost of economic regulation for each of those five main areas . We will focus our analysis on traffic misallocation, excess capacity costs, the administration costs. For this we make use of all available empirical results of econometric models concerning the Belgian goods transportation sector. For the model specification, the estimation procedure, the data samples and the empirical results we have to refer the interested reader to the bibliography.

3.1. Traffic misallocation

Someone making a modal choice cares only about the freight rate and quality-of-service differentials. Due to adverse regulation, freight rates may not reflect the relative marginal costs among the various modes, and shippers are frequently encouraged to use a higher-cost mode. Therefore the modal choice can be inefficient from a society's point of view.

To estimate this cost to society the existing traffic must be compared with the ideal traffic allocation if each mode equated the rate with the marginal costs. In an earlier study we estimated the consequences of such a hypothetical exercise (Van de Voorde, 1985, pp. 299-308).

Our starting-point was the observation that on average the inland navigation and the trucking industry succeed in covering their marginal costs, the railway company does not. In a simulation exercise using a modal split model we accepted the assumption that in the short run the railway company increases its commodity

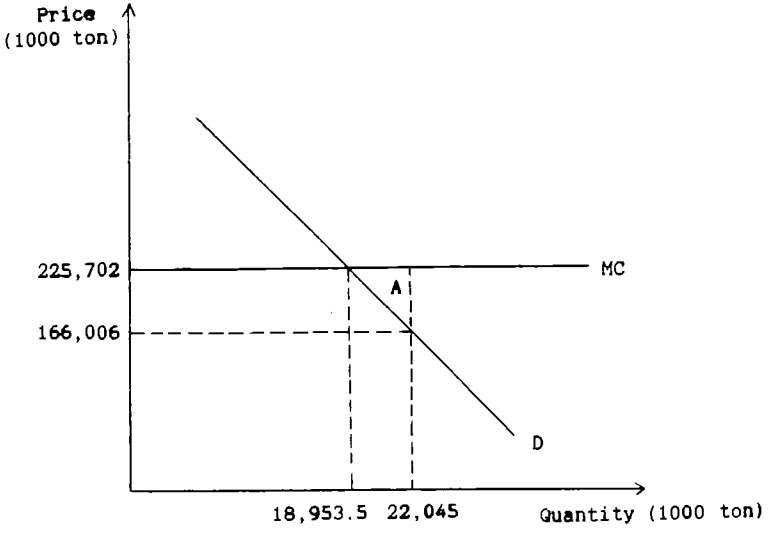
transportation rates by 35.96 % (i.e. the difference between the marginal cost and the current rate). It consisted of a linear rate increase, without any differentiation towards commodity categories. The exercise was limited to those commodities where effectively modal shifts could be calculated.

Table 2 gives for rail transportation a survey of the simulation results for the commodity categories coal, mineral oil, fertilisers, chemical products.

Table 2: Rail transportation: simulation results (2)

Goods category	tonnage (x 1,000) existing traffic	simulation	difference
coal	14,480.6	12,705.2	- 1,775.4
mineral oil	4,107.5	3,574.9	- 532.6
fertilisers	1,892.8	1,523.5	- 369.3
chemical prod.	1,564.1	1,149.9	- 414.2
total	22,045.0	18,953.5	- 3,091.5

Figure 1: Welfare loss due to traffic misallocation



(2) The estimations were made on the basis of data for 1981, since for that year we had a disaggregated data base (43 regions, 52 commodity groups).

The market inefficiency due to too low a railway rate is given by the triangle A. Assuming a linear cost function and a linear demand function, and constant marginal costs, the area of this triangle is equal to half the difference between rates and marginal costs, multiplied by the difference between the existing traffic and the traffic demanded at a rate that equals the marginal costs.

For the Belgian railway company, due to market inefficiency for the four commodity groups concerned together, we get a welfare loss of:

$$W = 1/2\ (225{,}702 - 166{,}006)(22{,}045 - 18{,}953.5) = 92{,}275{,}092 \text{ Bfr}$$

with: 225,702 = marginal cost
166,006 = current rate
22,045 = tonnage carried at the current rate
18,953.5 = tonnage carried at a rate that equals the marginal cost

At prices of 1986 this corresponds to more than 121 million Belgian francs. This amount has to be considered as a rough approximation. On the one hand we used the average tariff of the total railway commodity transport, on the other the shifts were calculated for only four commodity groups. The calculated effect refers only to those four categories.

3.2. Excess capacity costs

Excess capacity means that the short-term cost elasticities are smaller than the long-term cost elasticities, i.e. cost can be reduced by decreasing the capital stock. The problem is, however, that there are no short-term and long-term cost elasticities available.

An alternative approach could be to determine how much the output will increase if the existing capacity is better utilised. Companies transporting their own products do have a lower load factor than specialised transportation firms. The reason is undoubtedly the prohibition to accept a backhaul for a third company. It concerns a specific cost of regulation. The load factor of a specialised truck company can be considered as an upper limit. There is always a certain unavoidable excess capacity, since it is impossible to have full utilisation of the material at every moment.

Table 3 gives the load factors (figures of 1986) for trucks and trailers, respectively for companies transporting their own products and specialised transportation firms.

Table 3: Truck transportation: load factors (1986)

Type	companies transporting their own products	specialised transportation firms	difference
trucks	34.1	37.1	+ 8.8 %
trailers	41.1	45.7	+ 11.2 %

Source: Belgian National Institute of Statistics (N.I.S.)

Assume that regulation is raised in the sense that a company transporting its own products is also allowed to accept a backhaul for a third company. Assume also that this leads to load factors that are as high as in the specialised sector, and that these higher load factors correspond with an equal reduction of the distance run with cargo (expressed in kilometres) (3). Since we know the cost per kilometre for an average vehicle (Van de Voorde, 1985, p. 256), a calculation can be made of the realised cost savings.

Table 4: Calculated reduction in the number of kilometres (own transportation) (1986)

Type	number of kilometres with cargo (x 1,000 km) (1)	estimated reduction (x 1,000 km) (2)	cost/km for an average vehicle (3)
trucks	1,381,058	121,533	47.88
trailers	222,854	24,960	45.19

Source: (1) and (2): Belgian National Statistical Institute (N.I.S.)
(3): Van de Voorde (1985)

Savings of 5,819 million Belgian francs were calculated for trucks, 1,128 million Belgian francs for trailers. This gives a total amount of 6,947 million Belgian francs, a much more substantial figure than the welfare loss due to traffic misallocation and as such from a policy point of view a much more important issue. However, the question is whether with deregulation load factors would rise to those of specialised transport firms. There are a number of reasons why own account road haulage probably will achieve lower load factors because of the types of business, such as local delivery, which own account firms concentrate in.

3.3. The administration costs

The quantification of the administration costs of starting and maintaining the regulation process itself is extremely difficult. In the past it was accepted in Belgium that regulation could be managed

(3) We do not consider the possible effects on e.g. the capacity usage of the specialised sector.

with the resources that are already available at the Ministry of Transportation, without extra costs.

This means, however, that with deregulation fewer resources will be needed, i.e. there are avoidable costs. Indeed, some government departments can be abolished or used for other productive tasks.

We calculated as an example the yearly cost of the "Dienst Regeling Binnenvaart" (DRB), an office specifically set up for the regulation of the inland navigation sector (organisation of the rotation system, rate setting,...). The expenditures for 1986 amounted to 128.7 million Belgian francs, those for 1987 amounted to 101.5 million Belgian francs. If we divide the expenditures of 1986 by the "production" of the inland navigation sector covered by the regulatory agency DRB (1,749 million ton-kilometres), we get an amount of 0.074 Belgian francs per ton-kilometre. This is a very small amount. The important issue clearly is the efficiency cost resulting from inadequate distribution of activity over barge types. This aspect has not been dealt with in this study.

CONCLUSION

Traditionally, economic regulation is considered as a opportunity to allocate optimally resources in situations in which the market mechanism is not able to generate a competitive set of prices and quantities.

Empirical studies, for instance for rail commodity transport, showed, however, that economic regulation rather than improving the economic wealth was responsible for some distortions in the competitive relation with the inland navigation sector and the haulage sector.

Starting from a survey of the economic regulation in the Belgian commodity transportation sector, two elements were investigated in this paper. Do the conditions for successful regulation exist? What are the typical costs of transportation regulation, and can they be estimated?

Concerning the conditions for successful regulation the answer is uncertain. External effects do not justify regulation. Economies of scale do not exist in the haulage sector and in the inland navigation sector, only limited density economies in rail transportation.

The costs of the regulation process, a possible incentive for deregulation, were calculated for some items belonging to three

categories: traffic misallocation, excess capacity costs, the administration costs. In the case of excess capacity costs it consists of an important amount of money.

This paper has to be considered as a first exploratory investigation. It would be interesting to do complementary research towards a complete cost-benefit analysis of the dilemma regulation versus deregulation.

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