

# **INCENTIVE CONTRACTS IN NORWEGIAN LOCAL PUBLIC TRANSPORT: THE HORDALAND MODEL**

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## **1. INTRODUCTION**

In Hordaland county in Norway, performance-based contracts between the transport authority and the bus operators were signed in year 2000. This paper will investigate the development of this particular contractual type. Apart from a more limited performance-based contract in Oslo, Hordaland was the first county in Norway to adopt a principle of performance-based contracts. The key characteristic of the performance-based contract is that the subsidy is determined by the level of service provided.

We will argue that there were certain historical and structural developments that enabled the pioneering development of the performance-based contracts. We will discuss the elements of this contractual type, and investigate the experiences so far. We have conducted a number of interviews of various stakeholders in order to assess these experiences.

Hordaland county is located in Western Norway. Having a population of 440,000 it is the third largest of nineteen Norwegian counties. The county capital is Bergen, which is also the second largest city in Norway. Around 60% of the population in Hordaland live in Bergen and surrounding municipalities. There are three large public transport companies in Hordaland, one of which serves the urban area and two which operate in rural areas and the main corridors into Bergen.

## **2. BACKGROUND: PUBLIC TRANSPORT ORGANISATION IN NORWAY**

In Norway, the “Samferdselsloven” (Transport Act) states that any person or company undertaking scheduled transport operations must have a “løyve” (authorisation) which is granted by regional government (the County Council). These authorisations are granted either on an area or a route basis. Therefore, private operators have the right of initiative, but this is subject to quite detailed regulation as defined in the Transport Act.

The authorisations also serve as licences, i.e. the right to enter the occupation of passenger transport operator. They are granted on the basis of good repute, financial standing, and competence. The authorisations may or may not involve exclusive rights for operations within the area or on the particular route. Normally, the authorisations are valid for 10 years. The authorisations are in many cases held by companies that have enjoyed a historical monopoly in their respective areas.

Regional authorities (the county councils) are responsible for intra-regional and urban transport. The local municipalities (including cities) do not have any legally assigned responsibility for or control on local public transport operations.

According to the Transport Act, the county councils are responsible for granting subsidies to the operations of local routes that the council itself wishes to establish or uphold. The State provides annual “frame subsidies” which are intended to partly cover the counties’ expenses. The county councils can agree that the organisation that receives subsidies may be granted an exclusive right for operations within the area or route. The local municipalities (including cities) have no legal responsibility for subsidising local public transport, but are free to engage in specific subsidy schemes.

Thus, the Transport Act does not place any obligation on authorities to provide services. The School law, however, states that pupils living more than four kilometres from school (currently two kilometres for the youngest and six kilometres for college pupils) are entitled to free transport. Normally, the county councils covers a child fare equivalent for each pupil transported, but this does not necessarily correspond to the marginal cost of school transport.

The Transport Act states that the county councils determine contractual forms and guidelines for the allocation of subsidies. The most common organisational form in Norway is that of a market-initiative system (ISOTOPE 1998), and most counties use net-cost contracts. Therefore, Norwegian public transport is apparently subject to less public control than public transport in neighbouring Sweden and Denmark and many other European countries. In practice, however, the bargaining power of the County Councils is quite high, as they set the subsidy level and also have a number of possibilities to limit or even decide a number of tactical level (ISOTOPE 1998) issues such as fare structure, fare level, route networks and timetables.

In 1991, after a long process, the Transport Act was revised and the new legislation allowed contracts based on competitive tendering. However, the Act did not come into action until April 1994, when the amendments were given. As from 1994, the revised Transport Act stated that subsidy contracts that involve tendering apply for at least five years. Furthermore, the county councils may reduce the duration of authorisations if tendering is applied. The Act also enabled councils to establish “administrasjonsselskaper”, PTEs/transport planning

agencies that administer a number of tasks related to the planning and operations of transport services in the region. These changes have led to several counties adopting a gross-cost contractual framework, thus shifting the revenue risk and a number of tactical-level decisions from the operators to the PTE.

### **3. BACKGROUND FOR THE CONTRACTUAL DEVELOPMENTS IN HORDALAND**

Hordaland county council is the political and administrative body responsible for local public transport. There are three major operators in the area: Gaia Trafikk AS, HSD Buss AS and Bergen-Nordhordland Rutelag AS. Gaia Trafikk AS operates in Bergen and the surrounding suburban areas and was formed as a merger between the publicly-owned A/S Bergen Sporvei and the semi-private Pan Trafikk AS. The latter company was formed in 1992, again as a result of mergers. There has thus been a substantial degree of corporate consolidation in the Bergen area. The Municipality of Bergen owns 43% of Gaia Trafikk AS and thus has direct but partial control of this operator. HSD Buss AS and Bergen-Nordhordland Rutelag AS operate the major routes between Bergen and the districts in Hordaland, and rural services within Hordaland. These two operators are privately owned.

There are several background characteristics that are important for the contractual developments in the county:

#### **a) Large companies with considerable market knowledge**

Traditionally there have been locally based, but (in a Norwegian context) quite large bus operators in Hordaland. This is an important circumstance for the new contract. The companies have been large enough to develop professional organisational structures with significant bargaining power. Several companies are regional transport companies with substantial ferry, express boat and local boat operations. The topography of Hordaland necessitates a close integration of ferry, boat and bus services. This structural and historical situation explains that the regional companies have developed considerable market competence.

However, the companies in the Bergen area were considered to be more production-oriented than market-oriented, partly due to increasing financial pressure as subsidies were reduced. Arguably there has also been a “public sector culture” due to public ownership in the largest company, emphasising worker’s rights and promoting higher wages. This culture was under pressure throughout the 1990s.

#### **b) Net cost contracts**

In Hordaland, traditional net cost contracts have been used, allocating not only production risk, but also the revenue risk to the operators. This is the most

common model in Norway. It can be argued that this model was particularly suitable for Hordaland, with a limited number of large operators with considerable market knowledge and the possibility for integrating ferry and bus services.

The net cost regime provides a “natural incentive” for allocative efficiency as operators attempt to maximise revenues and not only minimise costs. However, the actual performance will also depend on the level of subsidy. In theory, operators will only operate those services where ticket revenues exceed marginal costs. With a high level of subsidies, as is the case for much rural transport, additional incentives are required for upholding the service.

### **c) Co-operation**

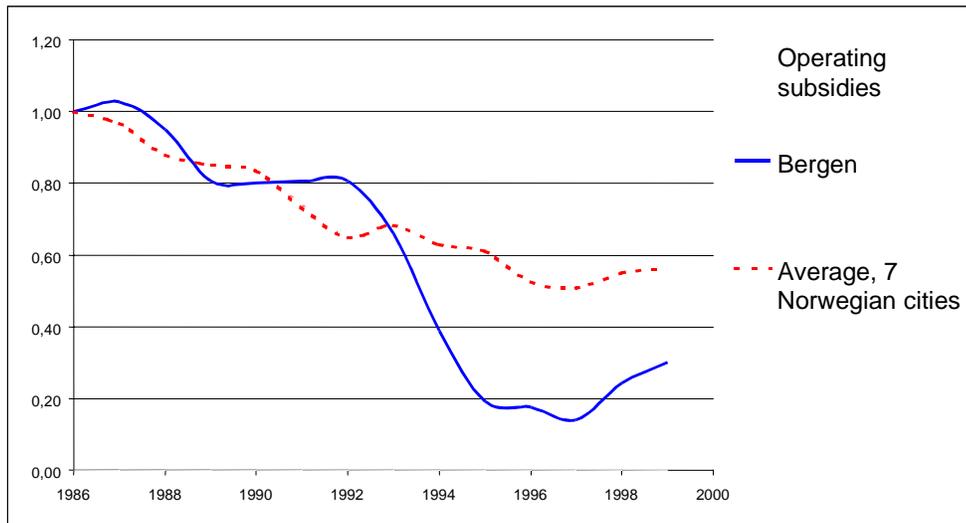
Previous to the merger which resulted in Gaia Trafikk AS, there was a high level of co-operation between the companies in Hordaland. An electronic ticketing system (BUS-POS) was common to most of the companies, and provided detailed information about travel habits as well as being an integral part of the financial information system. The system was financed by Hordaland County, in part with earmarked State funding. The companies also co-operated with regard to customer information, by means of the jointly owned Bergen Busstasjon AS. The two companies that eventually formed Gaia Trafikk (Pan Trafikk and Bergen Sporvei) initiated a route integration programme in 1992, and the networks became increasingly integrated throughout the 1990s. The bus companies thus had a strong degree of co-operation on operational and tactical matters. Negotiations were to a large extent conducted by TL Hordaland, the regional operators’ association. This also increased their bargaining power vis-a-vis the County.

### **d) Subsidy reductions**

Subsidy reductions in Bergen<sup>1</sup> followed a path fairly similar to that of the other largest Norwegian cities until 1990 (Carlquist and Fearnley 2001). From 1992 to 1995, subsidies fell sharply, and have since stayed at a low level, albeit with some increases at the very end of the decade, see Figure 1.

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<sup>1</sup> At the time of writing, we have not received data for the entire county.



**Figure 1.** Operating subsidies for public transport in Bergen and the average for the seven largest Norwegian cities (1986=1,00), fixed NOK.

Due to the potential for reducing costs by introducing tendering, The Norwegian State reduced its overall subsidy to county councils by 140m NOK in 1995, of which 18m for Hordaland. In each of the following years, the overall subsidy was reduced by 54m NOK per year, of which 7m per year in Hordaland. This considerable change escalated the subsidy reductions in the Bergen area and can be seen as a further trigger for reform.

The total operating subsidy from Hordaland county to the urban bus companies was reduced by 81,5% from 1992 to 1997. The operating subsidy from Hordaland county to A/S Bergen Sporvei, the inner-city operator, was reduced by 100% from NOK 26,6 million (abt 3,25 m euro) in 1992 to nil in 1997, however, there were subsidies for special services for the disabled. There were also changes on the municipal level. Until 1993, Bergen Kommune granted a regular operating subsidy to Bergen Sporvei AS. This special subsidy from the municipality was abolished from 1994, with the exception of a small (2m NOK) trolleybus grant which was continued.

The operating subsidies to Pan Trafikk AS were reduced by a somewhat lower rate (73% from 1992 to 1997), most likely due to the fact that this company had a larger proportion of rural obligations, especially school services.

### **e) Contractual developments previous to year 2000**

Up to the early 1990s, there were annual negotiations and a fairly simple contract which regulated the level of subsidy and the obligations of the operators. Gradually, a system of “normalised cost models” was introduced, providing an incentive for cost reductions. This system was fully in use from 1993/1994. It was

based on a normalised cost system developed by a consulting company in the 1980s, but adjusted to regional requirements. Whereas the previous system was based upon the operators' own budgets and accounts, the normalised system was based on more independent or objective cost standards ("norms"). This was considered to provide strong incentives for efficient operations, as the annual subsidy would be independent of financial results and subsidies in previous years (Gaasland 1998).

The normalised cost model was considered fairly rigid, in terms of the number of cost components to be monitored. It was also considered costly as companies devoted substantial resources to reporting cost levels and arguing that the normalised levels did not correspond to those which "should" apply for the individual companies.

A new contract, an "efficiency agreement" was signed for the years 1996-1999, including a clause that tendering would not be implemented at least until 2000. The efficiency agreement was considered more flexible and gave the operators the opportunity to prepare for a situation of increased competition. Similar to the normalised cost agreement, however, the efficiency agreement did not include any incentives for increasing revenues or patronage. An independent consultant evaluated the efficiency agreement in 1999, and the need for a more market-oriented contractual form was strongly emphasised.

#### **4. DEVELOPING A PERFORMANCE BASED CONTRACT IN HORDALAND**

In general, a contract is required when the principal (contractor, regulator) and the agent (contractee, firm) have to some extent conflicting objectives, and when one of the parties has an informational advantage over the other (Laffont and Tirole 1993). In theory, the authority's objective is to maximise social welfare given budgetary constraints, whereas the bus companies' objectives will be to maximise profits. In practice however this picture is more complex.

Firstly, the authority consists of a political and an administrative level, which in itself constitutes a principal-agent chain. In Hordaland, the principle of performance-based contracts was adopted *before* the model was developed, so there was no model simulation of different contractual regimes. The contractual form was thus politically decided and not an outcome of a detailed decision making process at the administrative level.

Secondly, although profit maximisation is a primary objective for the bus companies, they also seek to provide an adequate service. This is not only a subgoal facilitating profit maximisation, but arguably also a primary goal that could be in conflict with profit maximisation. This is due to the historical and local embeddedness of the companies. This embeddedness may itself prove to be

an incentive, but it is not easily verifiable and thus difficult to include in the contract.

Asymmetry of information is predominantly due to the companies' being closer to the customer and therefore enjoying more market knowledge than the authority. In Hordaland as in many other Norwegian counties this situation has been intensified due to the long-standing tradition of net-cost contracts. Furthermore, the authorities can only to a certain extent monitor the performance of the bus companies, and is dependent on trustworthy and precise reports.

These conflicting goals and the asymmetries of information provide a challenge for the development of performance contracts. Before the contractual reform, the fare structure, fare levels, routes and timetables were decided by the politicians of the County Council. Operators suggested routes and timetables, which were processed by the County Administration and approved by the County Council. Fare structures and levels were suggested by the Administration, and the Council approved. There were no specific standards for minimum area coverage and frequencies as this was in practice handled through the time table decisions.

The contractual reform process in Bergen started in 1999 and involved increased freedom for operators to designate the public transport system, involving an increased focus on passengers and the market, and consequently a contractual change. The initial proposal for this reform was, however, quite different as it involved tendering and a larger extent of authority initiative. The County Transport Administration proposed in 1998 to apply tendering from 2000, and to establish a separate organisation (PTE) for organising the tendering and purchasing. The Administrations' proposal was not approved by the County Council. Instead, the County Council in 1999 adopted the principle of a performance-based contract, which had been introduced on a trial basis in Oslo. Hordaland County Council however went further and adopted a full-scale performance contract.

Actor	Transport authority		Operators		
	Political council	Transport department	Publicly owned bus company	Private urban bus company	Private regional bus companies
Strategic	Transport pol.				
	Social pol.				
Tactical		Mobility std			
		Accessib. std			
		Fares			
		Routes			
		Timetables			
Operational		Vehicle type			
			Sales	Sales	Sales
			Information	Information	Information
			Person. mngt.	Person. mngt.	Person. mngt.
			Vehicle mngt.	Vehicle mngt.	Vehicle mngt.

**Figure 2.** Division of responsibilities in Hordaland, previous to the performance contract and the Gaia Trafikk merger

Actor	Transport authority		Operators	
	Political council	Transport department	Public/private urban bus company	Private regional bus companies
Strategic	Transport pol.			
	Social pol.			
Tactical		Mobility std		
		Accessib. std		
		Quality. std		
Operational			Fares	
			Routes	Routes
			Timetables	Timetables
			Vehicle type	Vehicle type
			Sales	Sales
Operational			Information	Information
			Person. mngt.	Person. mngt.
			Vehicle mngt.	Vehicle mngt.

**Figure 3.** Division of responsibilities in Hordaland according to the performance contract

## 5. PRINCIPLES FOR THE HORDALAND CONTRACT

The key principles in this kind of performance-based contract are firstly, that the operator is given financial incentives for product development. Secondly, the authorities define a framework comprising overall quality requirements regarding price, service and accessibility. The contract will be tendered if the operator fails to fulfil the predetermined criteria. Finally, joint co-operation is required for the contract to be fulfilled. The authorities are obliged to enforce measures to improve the effectiveness of the public transport system.

### **a) Incentives**

The most important incentive in this kind of contract is in fact constituted by the market itself. The contract is a net contract, implying that the operator retains all ticket revenues and therefore has the “revenue risk”. There is thus a strong link between passenger demand and operations. This is a model that seems to work well in Norway, given a fairly low level of subsidies – in the Bergen area, only around 8 per cent. This means that 92 per cent of the total revenues are generated in the market.

At the same time, public transport, having elements of being a public good, requires extra incentives, in addition to the market-based, to avoid a level of production lower than what is economically effective. Such incentives apply for minimum mileage, e.g. with regard to school buses and other socially necessary services, although this may be granted as a fixed subsidy. More importantly, it applies for increasing frequency and mileage, which implies gains for existing passengers as well as attracting new passengers (modal shift). This is especially valid for peak hour passengers, when the marginal costs of extra departures are high.

In the contract suggested by the Institute of Transport Economics, the entire subsidy amount was to be performance-based. There were specified rates for subsidies per route kilometre, per vehicle hour for peak hours and off-peak, and an additional amount per passenger in peak hours. These rates should vary among the operators, depending on the proportion of urban versus rural mileage. There was a ceiling for the total amount granted from the council to the operators. The subsidies should be paid on a monthly basis.

The rates were calculated in a way that, even though the operator will maximise profits, his adjustment should be economically optimal, given the defined aims and budgetary constraints (Larsen 2001). Thus, in summary, there are two types of incentives: one revenue-based, and one subsidy-based.

### **b) Quality framework**

The second key element is that the authorities define a framework for the minimum quality of service, with regard to fares and accessibility. This also involves a customer satisfaction survey. In the suggested contract, if customer satisfaction falls below 90 % of the target level, the authority, Hordaland County Council, can put the contract out for tender.

The operators are granted a substantial degree of responsibility for planning and product development. This means that the operators themselves decide on timetables and frequencies, vehicle types and fares, i.e. elements belonging to the tactical level, not only the operational. The authorities define certain minimum criteria, and otherwise do not intervene on the tactical level.

A key point is that there must be a balance between responsibility and risk. The actor that is responsible for revenue generation must also have the planning (or tactical) responsibility. The companies have great freedom to change the mileage and fares as long as the levels do not exceed or fall below the specified boundary

levels. But on the other hand, they are subjected to the risk involved by changing mileage or fares.

### **c) Co-operation between authorities and operators**

The third element is related to the joint responsibility for fulfilling the contract. A public transport committee was to be established, in this case with participants from Hordaland county, the local authorities (municipalities), the operators, the police, and the Hordaland road administration. This committee is responsible for improving bus priority measures, information provision and bus stops/terminals. This is necessary as the contract is very demand-oriented: there must be structural improvements that make demand increases possible. There are, however, less clear incentives for such system development, but at least responsibility is located at the authority level, something which has not previously been done. It is also stated that if Hordaland County achieves savings through cost reductions in bus companies, these savings should be used to improve public transport services. The operator, of course, is responsible for producing the service according to the quality requirements.

One of the challenges for the authorities is to ensure a sufficient level of information to engage in negotiations and keep track of operators' costs and performance. Within this model, authorities have less information on the tactical and operational levels than in a tendering regime. On the other hand, it is not necessary for authorities to scrutinise quality aspects in detail, as is the case with many full-cost contracts. The revenue incentive is in itself sufficient to ensure quality.

## **6. SUBSIDY CALCULATION**

The Hordaland model is based on three performance items. For the sake of simplicity, we will assume that there is only one performance item, actual vehicle kilometres produced (VKM) and one rate<sup>2</sup> (RATE), i.e. Norwegian Kroner per vehicle kilometre. The subsidy is subject to budgetary constraints, and cannot exceed a predetermined level. A fixed deduction (FD) is defined in the base year (2000) and is subtracted to yield the subsidy (S).

This gives the following equation:

$$(1) \quad S_t = (\text{RATE} * \text{VKM}_t) - \text{FD}$$

so the estimated subsidy for year 2000 will be

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<sup>2</sup> The rate is index regulated each year

$$S_{2000} = (\text{RATE} * \text{VKM}_{2000}) - \text{FD}$$

As year 2000 is the starting point of the contract, the fixed deduction for the subsequent years (FD') depends on the actual mileage level in 2000:

$$(2) \quad \text{FD}' = (\text{RATE} * \text{VKM}_{2000}) - S_{2000}$$

Therefore, the subsidy for 2001 is a function of vehicle kilometres produced:

$$S_{2001} = (\text{RATE} * \text{VKM}_{2001}) - \text{FD}'$$

The incentive scheme is explained in detail by Larsen (2001). The key point here is that not only ticket revenues, but also the subsidy level, depends on performance, i.e. vehicle kilometres in this simplified example.

We therefore have a situation where profits ( $\pi$ ) are co-determined by different performance-based factors, namely ticket revenues (I), subsidies (S) and costs (C). Ticket revenue is the product of fares (P) and demand (X), and demand is a function of vehicle kilometres (mileage production) and fares.

$$(3) \quad \pi = I + S - C$$

where  $C = f(\text{VKM}, \dots)$

and  $I = P * X$  and  $X = g(\text{VKM}, P, \dots)$

Given a “right” incentive (RATE), the operator will decide on a fare level (P) and production (VKM) at a level which maximises profits and maximises social welfare, given the budgetary constraints of the county council.

The actual incentive rates that were suggested in the initial report by the Institute of Transport Economics (Carlquist et al 1999) are presented in table 1 (other rates were applied in the contract):

**Table 1:** Suggested subsidy rates in NOK for the four companies (Vest Trafikk AS was since acquired by HSD Buss)

	Per vehicle kilometre	Per vehicle hour (base production)	Per vehicle hour (extra peak production)	Per peak hour passenger
GAIA	3,50	130	300	0
VEST	2,50	130	250	0
BNR	1,50	130	250	10
HSD	1,50	130	250	9

## 7. EXPERIENCE

It is too early to fully evaluate the performance contract in Hordaland. The level of subsidy granted by the county council (the ceiling) is still very low, so the distribution of subsidies among the three operators cannot vary very much, compared to the 1999 level, before the new contract was signed. Nevertheless the new contract has brought about a number of issues for discussion.

### a) Increased market orientation

From focusing very strongly on cost reductions, the operator is clearly becoming more market oriented. The operator has conducted a large-scale customer survey, sent to the entire population in Bergen. This is in addition to the satisfaction surveys required by the contract, and the results of the survey were considered uplifting, especially as the media coverage in year 2000 had a very negative focus. Secondly, a new customer service centre has been established in downtown Bergen. Thirdly, from August, a customer charter will be established, quite similar to that in Oslo.

### b) Use of incentives diverges from the original suggestion

Year 2000 was a transitional phase, with only some elements of the performance contract being implemented. Many improvements are possible. The rates per vehicle kilometre and vehicle hour are based on the total mileage of each bus company. Ideally the subsidy should vary between different areas, based on factors such as patronage potential, route length and average speed. In practice this is difficult to obtain, but in the long run one should seek to calculate rates for geographical areas rather than companies. Another and more obvious improvement would be to increase the subsidy ceiling, which also has the effect of reducing the relative impact of the original 1999 subsidy allocation.

A patronage-based incentive component, which was initially suggested by the Institute of Transport Economics, was taken out of the final contract. The model simulations suggested that one of the companies (the urban operator) should

receive a rate per rush hour passenger. The rate was zero for this particular component for the other two companies, which operate in more rural areas with less demand potential on average. This proved to be controversial as the other two companies found it reasonable that they too should receive a patronage-based incentive. Because of this, and general budgetary limitations, this item was omitted from the contract. A model which can differentiate between different areas (including those with a demand potential) would alleviate this problem.

The performance-based incentive system of the existing contract has been employed successfully, although there have been instances where the performance contract has been assumed not to function adequately. In the Kokstad/Sandsli business development area by Bergen Airport, there has been a need for improved services, however, the marginal costs of bus operations due to traffic congestion has been high. The incentive offered by the contract has not been large enough to cover this extra cost, and a specific subsidy (around 20% of the total subsidy for the operator in question) for this service has been negotiated.

The contract also states that a bonus/malus system should be initiated in 2001. The bonus/malus is based on customer satisfaction (30%), reliability (10%), punctuality (10%) and passenger trips (50%). Theoretically, this is not in accordance with the original aim of the performance-based contract as all incentives should be incorporated in the rates.

#### **c) Few changes to route network**

The operators cannot reduce the amount of network kilometres without prior consent from Hordaland County. However, they are free to reduce services, and given the pressure on profit margins and the assumption that the initial route network and timetables contained a number of sub-optimal services, a number of service changes could be expected. This has not happened, in fact, the service in summer 2001 is very much similar to that in January 2000.

This lack of change could be due to general organisational inertia. Another explanation is that there is a considerable degree of resistance among customers. The perceived cost of reducing service levels, including disapproving opinions, negative press coverage, and the potential loss of passengers on other services, exceeds the expected gains. One of the operators attempted to reduce weekend services in a semi-rural area outside Bergen. This service produced an operational loss. The service was retained as there were massive protests at the local level. This kind of reaction too must be seen as a consequence of the level of freedom implied by the contract. An authority-initiated decision to change the service may have been less vulnerable to public opinion, leading to the withdrawal of the weekend routes, which may or may not have added to social welfare.

#### **d) Low level of conflict**

Both parties agree that there has been a fairly low level of conflict after the contract was signed. One reason for this may be that the contract to a large extent is based on verifiable variables, which may if necessarily be checked by a neutral third party. The most important reason is probably that the companies now have the responsibility for adjusting the network, route production and fares, and thus the negotiations focus mainly on broader issues such as the subsidy level. Furthermore, both operators and authorities explicitly share the aim of increasing subsidies in the future.

## **8. CONCLUSIONS**

In summary, the Hordaland model has so far proved to be quite successful. This type of contract is suitable for areas where it is possible to increase demand. It is also possible to apply similar contractual types in situations where product development which would not otherwise take place will produce social welfare benefits. The Hordaland model implies that the operators hold much of the responsibility for tactical level decisions (fares, network structure and production), and therefore it is suitable primarily in a net-cost regime, although other forms of performance-based incentive contracts could apply to gross-cost systems. This kind of contract does however require the commitment of both parties to actively increase demand for public transport.

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