

Summary:

Market Efficient Public Transport?

An analysis of developments in Oslo, Bergen, Trondheim, Kristiansand, and Tromsø

Background

Government subsidies to public transport in many Norwegian urban areas have steadily diminished during the last ten years. This is partly a result of reduced state subsidies to the county councils, increased use of productivity agreements, and the threat of increased future competition due to tendering. In sum, subsidies have been reduced by some NOK 1.2 billion between 1986 and 1997 (measured in 1997 prices), equivalent to 42 per cent in fixed prices. For a number of urban areas, the reduction in public subsidies is considerably more substantial, and several companies in the largest urban areas now operate without any subsidies at all. This applies, for example, to the public transport systems in Bergen, Trondheim and Tromsø. The increased economic pressure for public transport operators has resulted in reduced costs for the companies as well as increased fares for passengers.

Within the framework of the local transport project LOKTRA, the Institute of Transport Economics (TOI) has been commissioned to analyse the consequences of new organisational frameworks for public transport companies. Within the project "Institutional and financial frameworks for public transport", four analyses are being carried out:

- ✓ An analysis of restructuring of the urban bus transport industry
- ✓ An analysis of development trends based on local and regional bus transport statistics
- ✓ A description of international trends compared with the Norwegian development
- ✓ An in-depth analysis of public transport developments in 5 urban areas (this report).

Report focus and method

The focus of this report is to analyse to which extent the major subsidy cuts to public transport have resulted in more *cost efficient, production efficient or market efficient* public transport, i.e. whether the reduced subsidies are related to real efficiency gains for the operators, and/or whether costs have been passed on to other actors or parts of the sector.

In a situation where the costs of providing public transport are being reduced, the question arises as to whether these savings exceed the social costs, measured by a lower standard of services. In order to answer this question, we have analysed:

- ✓ The connection between subsidy reduction and quality development
- ✓ The connection between quality and passenger development
- ✓ Changes in quality and traffic measures.

The main source for the data material is the Scheduled Road Transport Statistics for the period 1986-1996 (Statistics Norway). A drastic restructuring and positioning has taken place in the public transport industry in recent years, resulting in complications in data collection and comparable time series data. The data have therefore been adjusted in accordance with guidelines supplied by the Transport Administration and available statistical data from the public companies.

Changes on the framework for public transport

On 11 May, 1990, the Cabinet proposed allowing tendering for licenses to operate subsidised

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public transport. This took effect from 15. April 1994. This was the most significant change in the public transport sector in the analysed period because the negotiating position between the operators and the transport authorities was changed. The *possibilities of using tendering* (implying a threat of increased competition) have changed the framework for public transport. As of 1.1.1999, however, only 2 per cent of scheduled traffic is open to tendering. In our analysis we have regarded 1991 as an important “turning point” as the preparation for tendering started that year. We have examined whether significant changes have occurred subsequent to the introduction of tendering.

Analysis of five urban areas with significant changes in subsidies

Attention is focused on the development in five urban areas which have experienced significant changes in subsidies in recent years: Oslo, Bergen, Trondheim, Tromsø and Kristiansand. The first four have experienced drastic reductions in subsidies while Kristiansand since 1990 has carried out a comprehensive programme for improving public transport. In total, these five urban areas experienced a reduction in subsidies of more than 600 million NOK between 1986 and 1997 (fixed 1997 crowns). Trondheim, Bergen and Tromsø have a subsidy level of 10 per cent or below (Figure S.1). The town centre routes currently operate virtually without any subsidies at all.

By comparison, the mean level of subsidies elsewhere in Europe is around 50 per cent. The large reductions in subsidies cannot be explained solely by the introduction of tendering, as substantial cuts in subsidies had been carried out in certain urban areas prior to the introduction of tendering resolutions in 1991. The largest cuts in subsidies in Oslo and Trondheim were completed before 1991. In Tromsø and Bergen the major cuts occurred after 1991. This may suggest that the individual county council's economic situation may have been an important explanatory factor for these developments.

Commercial consequences

If public transport accounts are to balance following cuts in subsidies, this will either imply

reduced costs, increased productivity, higher fares, or a combination of these factors. Our analyses reveal that all these measures are used, but in different phases throughout the period with which we have studied.

Reduced costs

Real cost efficiency increases in excess of 20 percent have occurred in Oslo, Trondheim and Kristiansand (Figure S.2). Increased cost efficiency is not only explained by reduced subsidies. First, there is reason to believe at there is a “natural” rationalisation within the sector, in line with other industries. In addition, there may have been indirect pressure on costs through the threat of increased competition. This point is emphasised as Kristiansand has a cost-efficiency development similar to that of other towns, in spite of the fact that the subsidies in this town have been increased.

There are also large differences before and after 1991 in terms of cost efficiency, but without any clear pattern emerging for the individual urban areas. We have observed that many companies were subject to considerable cost pressure before 1991, but also when the efficiency potential begins to decline, fare levels increase. This illustrates that the possibility for future cost reductions by introducing tendering systems is very much dependent upon the initial efficiency level. The significant increase in efficiency prior to 1991 suggests that the operators must have had relatively good cost-efficiency margins in this period.

Increased productivity

An essential element of cost efficiency is related to labour productivity. Even though labour costs account for only about half of the operating costs of bus routes, we have noted that the labour productivity gain exceeds that of cost efficiency in Oslo and Trondheim, but is a little lower in Kristiansand (Figure S.3): While Oslo, Trondheim and Kristiansand experienced a real cost efficiency gain of around 20 per cent, labour productivity has been increased by 32 percent in Oslo, 25 per cent in Trondheim, and about 18 per cent in Kristiansand. In Bergen and Tromsø, cost efficiency and changes in labour productivity are at about the same level. The figure also shows that the increase in labour

productivity has generally been reduced although it is too early to state whether this indicates that the bulk of the productivity gains have now been achieved.

There has also been a more intensive utilisation of the bus stock in recent years. There has been a clear increase in Kristiansand, Bergen and Tromsø of around 15 per cent. This indicates that re-investment in the bus fleet has declined and that the existing buses are used more intensively. On average the bus fleet has been reduced between 2 and 9 per cent in the period under consideration.

Increased fares and fewer passengers

Our analyses show that there is a clear relationship between subsidy reduction and fare increases: as the subsidies are reduced, some of the extra costs are transferred “directly” to the passengers (Figure S.4): Bergen has experienced the largest increase of around 40 per cent in the period 1986-97, while in Oslo, Trondheim and Tromsø, the increase has been in the range of 18 – 25 per cent. Kristiansand distinguishes itself from this pattern in that fares are about 10 per cent lower. According to our calculations this has resulted in a passenger decline of 16 per cent in Bergen, 6 per cent in Oslo, 8 per cent in Trondheim, and about 10 per cent in Tromsø. The reduction in fares in Kristiansand has resulted in a 5 per cent passengers increase throughout the entire period.

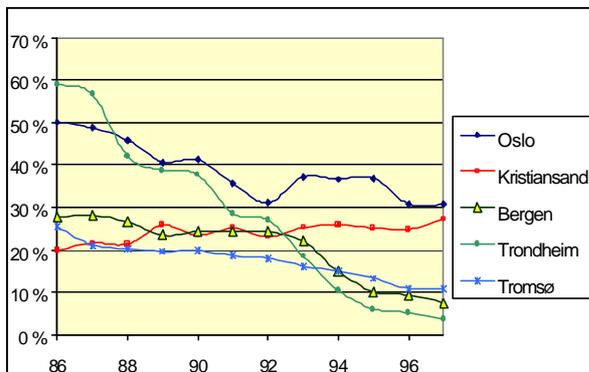


Figure S.1: Development in the levels of subsidies for the five urban areas

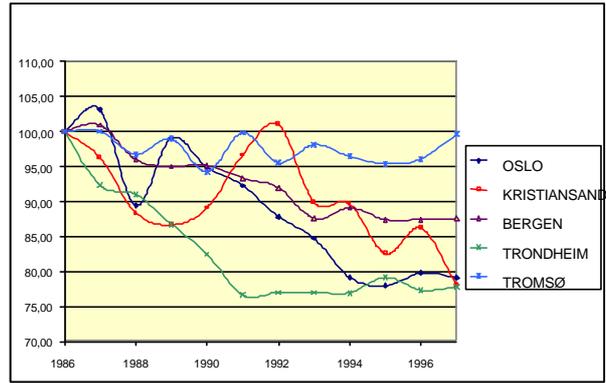


Figure S.2: Development of cost efficiency (1997 NOK per vehicle-kilometre) in the selected urban areas. Index 1986 = 1.00. Sources: Scheduled traffic statistics and companies' annual statistics

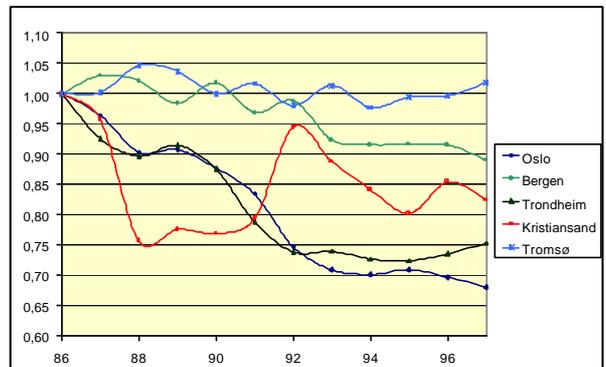


Figure S.3: Development trends in labour productivity measures in staff per vehicle-kilometre. Index 1986=1.00. Sources: Scheduled route statistics and annual reports

Market efficiency

In this analysis we have also examined whether the reduced subsidies have led to a reduction in the supply of public transport services, either quantitatively or qualitatively. This is the most complex part of the analysis, as it is difficult to calculate the effects of quality changes, and further, consistent time-series data do not exist for several of the essential qualitative variables. This applies primarily to vehicle quality and service reliability, but also to service frequency in the first part of the period. It is conspicuous that, with a few notable exceptions, public transport statistics fail to register consistent qualitative factors for the period surveyed. Our analyses are therefore concentrated on journey

time, frequency and price, and the external cost of increased car traffic.

Transport volume is maintained

Following a period of decline in the early 1990s, Oslo, and Kristiansand in particular, experienced an increase in the number of vehicle-kilometres. The increase in Kristiansand is partly a result of the “Norwegian Trial Scheme” combined with increased county council focus on public transport. The growth of vehicle-kilometres per capita in the Bergen region has been relatively flat with the exception of a peak in 1992-93. Vehicle-kilometres in Trondheim have remained fairly constant but have shown a steady decline in Tromsø although somewhat less so since the mid-1990s. However, there has been a significant increase following modification of the route network in October 1997.

Passenger trends

There are large variations between the towns examined here in respect of passenger development. While Oslo, Trondheim and Kristiansand have managed to maintain the public transport passenger level at around the 1986 level, these have fallen by 20-25 per cent in Tromsø and Bergen. Simultaneously, development trends in the other urban areas appear to reverse around 1990-92. Both Kristiansand and Trondheim appear to have enjoyed a “boost” as a result of the Norwegian Trial Scheme, but flattening out later. Oslo has seen a gradual increase since 1992, partly due to continual product development and long-term effects of the “Quality measurement programme” introduced in 1991.

Effect on demand of reduced subsidies

There are several factors influencing the passenger development in these urban areas. The project has therefore conducted different demand analyses in order to investigate the isolated effects of reduced subsidies. This analysis shows that the fare increase which has compensated for the subsidy cuts, has reduced public transport travel by 7 per cent (Figure S.7). Only Kristiansand experienced an isolated passenger increase by seven per cent during this period, as a result of changes in the transport

network or fares. If we compare the situation with 1990, which in many respects was a “turning point” in Kristiansand, the increase is considerably greater. From 1990 to 1996 the improved subsidies have resulted in a growth of 12 per cent of which 8 per cent is linked to improved bus services.

The other areas have experienced a declining market for public transport services, considering the whole period, and also when we consider the actual passenger figures and the isolated effect of service changes. According to our calculations the reduced subsidies have resulted in a 16 per cent reduction in the number of journeys per capita in Bergen, and 8 per cent in Trondheim.

The development in Oslo has shown an uneven pattern. In the first part of the period there was a relatively substantial fare increase, while in the latter part we observed reduced fares and an increase in the level of services. Until 1992 there was a decline of 8 per cent in journeys per capita, subsequently increasing by about 4 per cent up to 1997, giving a total net decline of 4 per cent over the period.

In Tromsø the level of services has been of little significance for the increase of journeys per capita while the fare increase after 1990 has contributed to a decline of some 10 per cent in total journeys. A significant part of the decline has been outside the urban area. Since 1995, developments have been more positive, and the new transport service introduced in 1998 may contribute to a further passenger increase.

Net savings

An overall review of the five urban areas shows that of the total subsidy cut of NOK 592 million, net savings are only NOK 135 million (22 per cent) when we take into consideration the increased costs for other actors (Table S.1). This suggests that 78 per cent of the subsidy reductions have been distributed as NOK 77 mill. (13 per cent) as a consequence of increased road traffic, NOK 33 mill. (6 per cent) as reduced service frequencies, and NOK 347 mill. (59 per cent) as increased fares. In addition to the fact that reduced subsidies led to a 7 per cent decline in the number of passengers, the remaining passengers have experienced a 25 per cent higher fare level. A significant proportion of the reduced subsidies have thus been

“financed” by the passengers, thereby weakening the competitiveness of the public transport sector. This may in the long term result in a further decline in the number of passengers.

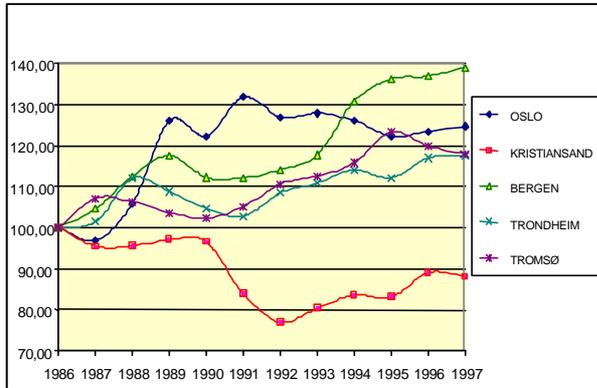


Figure S.4: Relative changes in fares. 1986 = 100

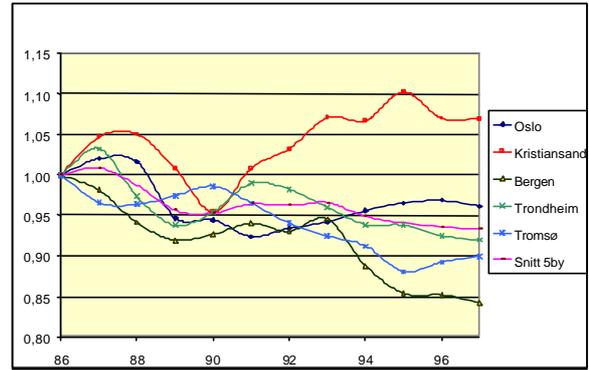


Figure S.7: Relative changes in total passengers in the five urban areas resulting from changes in fears and travel services

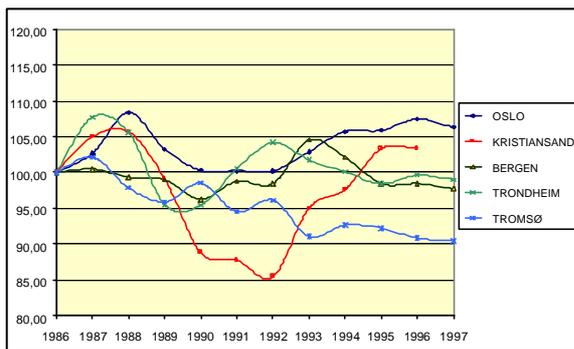


Figure S.5: Relative development in vehicle-kilometres per capita 1986-97

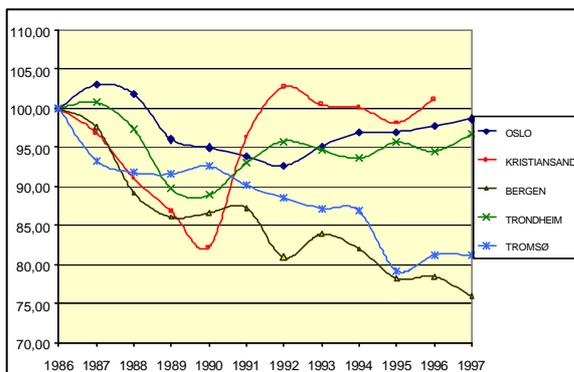


Figure S.6: Relative development in journeys per capita in the five towns 1986-97

Our analyses also show that in the first part of the period, up to 1992, the transport companies experienced a real efficiency gain while after 1992 the costs have largely been passed on to the passengers. When we regard all the five urban areas together, there has been an efficiency loss of NOK 32 million after 1992. These calculations show that there has been a considerable potential for efficiency within the sector, but that this was essentially reaped before 1992.

Table S.1: Socio-economic consequences of changes in the public transport sector.¹ Mill 1997 NOK.

5 TOWNS	1986-92	1992-97	1986-97
Changes in subsidies	-462	-129	-592
Costs of increased road traffic	45	32	77
Costs for passengers			
Increased travel time	-19	-12	-31
Reduced frequency	-	33	33
Increased fares	251	96	347
Net savings	-185	20	-166

¹ In this summary we have analysed the development before/after 1992, essentially owing to the absence of earlier frequency data.

Negative figures represent a socio-economic gain, whereas positive numbers represent socio-economic costs.

It is possible to split up the data for the five urban regions considered. Looking first at *Oslo* there has been a significant and real increase in efficiency throughout the whole period (Table S.2). In sum there have been annual savings of NOK 141 million, corresponding to 40 per cent of the total cuts in subsidies. At the same time it is important to remember that there is a considerable proportion of rail- and tramways in *Oslo* (about 60%), which indicates that current cost levels can be unproportionately low due to previous investments. This suggests that long term savings for *Oslo* can be somewhat less than the "short-term" period examined here indicates, and that this difference is more significant than for other towns. Nevertheless a substantial efficiency gain has been experienced in *Oslo*, in a period without decreasing subsidies.

According to our calculations *Bergen* and *Tromsø* are the only urban areas without a real efficiency increase. In total the costs of increased road traffic and reduced level of

services for passengers in *Bergen* are NOK 51 million higher than the subsidy cuts, and were higher in both the periods considered. Our calculations do not take into full consideration the effect of the increased co-operation between the companies which has taken place in recent years. On the other hand we have included the gains of shorter travel times as a result of extended road investments, resulted in an annual gain for public transport passengers equivalent to some 31 million NOK. The uncertainty of the total effect for *Bergen* is therefore considerably larger than for the other towns. We have not had the opportunity to go further into this in our study.

Similarly to *Oslo*, *Trondheim* enjoyed significant gains through efficiency in the period under examination. The gains for the whole period were NOK 84 million annually, equivalent to 70 per cent of the whole subsidy amount. This reflects the fact that public transport in *Trondheim* received subsidies which were twice the level in *Bergen*. This is partly due to the fact that the tram played a certain role in public transport in *Trondheim* the first two years. An analysis of developments after 1988 would have provided another picture, but also for the period 1992-97 there was a real efficiency gain of NOK 24 million per annum, or something in excess of 50 per cent of the subsidy cuts.

According to our calculations, *Tromsø*, similar to *Bergen*, experienced a socio-economic loss as a result of the cuts in subsidies. This is initially due to reduced frequencies and increased fares. At the same time there is a considerable difference between the urban and regional services which these calculations do not take into account. In *Tromsø* there has been a certain degree of change in priorities from rural to urban lines, and this is partly reflected in the reduced frequencies. This may moderate the picture somewhat, but nevertheless there is a socio-economic loss in *Tromsø* as the increase in fares alone exceed the cuts in subsidies.

Finally, we have looked at *Kristiansand*, which in many respects distinguishes itself from the other urban areas because the subsidies have increased rather than decreased. This means that we have studied socio-economic gains of increased expenditure on public transport in contrast to the other urban areas where we have observed a net saving as a result of reduced subsidies. This analysis shows that the increased subsidies totalling NOK 10 million annually

have resulted in a socio-economic gain of NOK 31 million, of which 2/3 may be attributed to increased frequencies and 1/3 to reduced fare levels.

Experience from Kristiansand shows that the increase in subsidies to public transport have resulted in significant economic gains, and when measured in terms of passengers, the gains are the highest of all areas in this analysis. Our

analyses have also shown that together with Oslo and Trondheim, Kristiansand has carried out the largest cost-effective exercise among all the towns we have examined, amounting to a gain of about 20 per cent. This signifies that public transport in Kristiansand, both commercially and socio-economically, has experienced the most effective transformation during the period under survey.

Table S.2: Socio-economic effects of changes in the public transport sector. Million 1997 NOK

Changes 1986-97	Oslo	Bergen	Trondheim	Tromsø	Kristiansand
Subsidy reduction	-353	-115	-120	-14	10
Costs of increased road traffic	34	40	6	-1	-1
Costs for passengers					
Increased travel time		-31			
Reduced frequencies	-10	27	4	31	-19
Increased fares	188	130	26	14	-11
Net savings	-141	51	-84	30	-21