9TH CONFERENCE ON COMPETITION AND OWNERSHIP IN LAND TRANSPORT

TRENDS AND DRIVING FORCES IN NORWEGIAN URBAN PUBLIC TRANSPORT

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INTRODUCTION

Organisational, financial and regulatory conditions for Norwegian public transport have changed substantially over the past two decades. Operating subsidies in Norwegian conurbations, which is the responsibility of the county councils, have been reduced dramatically over a longer period followed by sharp increases in recent years. Changes in the Transport Act, which allowed for competitive tendering of public transport operations, were approved by the Government in 1991 and set in force in April 1994.

Operators can compensate for subsidy reductions by reducing service levels, by increasing revenues or by cutting costs. This paper investigates how public transport operators have adapted to the new regulatory and financial conditions. Further, we present a "social welfare balance sheet" which includes the major costs and benefits of the developments in the public transport sector. Norheim and Renolen (1997) and Norheim and Carlquist (1999) developed a methodology for this, Fearnley and Carlquist (2001) expanded on their work and findings. This paper is a further elaboration of this series of analyses of urban public transport developments in Norway. It draws heavily on the latter reference, and is also in part based on the work of Vibe, Engebretsen and Fearnley (2005).

This work concentrates on eight major Norwegian urban areas: Oslo, Akershus county, Drammen, Stavanger, Kristiansand, Bergen, Trondheim, and Tromsø, in the period 1986–2003, see Figure 1. Akershus county surrounds Oslo and together they make Greater Oslo.

Figure 1: The Norwegian cities of Oslo, Drammen, Stavanger, Kristiansand, Bergen, Trondheim, and Tromsø.

1 METHODOLOGY

The analyses presented here use data from TOI's Urban Public Transport database. The database describes supply, demand, financial aspects, area information and socioeconomic indicators at an aggregate level for every year and for each of the 8 urban areas (7 cities plus Akershus county). Norwegian National Transport Statistics and the operators' annual reports are the main data sources for the database.

The introduction of the diesel duty in 1999 provided a challenge in the data validation process. In principle this fuel tax shall be reimbursed to bus companies, which means that it merely represents a shift in both operating costs and subsidies. In reality it has proven difficult to separate the fuel duty compensation from other transfers, and similarly to separate the diesel duty from other operating costs. On average the compensation has been around 95% of the diesel duty paid. With these reservations we have made our best efforts to exclude costs and subsidies that relate to this tax.

Some of the data that we use is confidential. In order to describe and compares trends for subsidies, costs, fare levels, supply and demand it has been necessary present them by way of indices, using 1986 as the base year. Indices make it easier to compare developments between areas that are different in many ways. The general problems with such indices are that they are very sensitive to the situation in the base year and that they do not provide any information of the actual levels. There are also problems with large fluctuations when the base level is very small. It has been necessary to leave out some observations either because they fluctuate too much or because there are weighty reasons to suspect they are wrong. "Average developments" are sometimes presented. When otherwise is not stated, these are unweighted. Weighted averages are very much dominated by Oslo, Akershus county and Bergen. Oslo alone represents for example more than 50 percent of all registered trips and about a third of route production in the eight areas.

In order to understand passengers' behaviour we have developed three different aggregated demand models, which relate the number of trips per capita to various explanatory variables. The models are 1) a constant elasticity regression model which provides global "rule-of-thumb" elasticities; 2) an area-specific fare elasticity model which allows the price elasticity to vary between the cities; and 3) a dynamic model which can distinguish between immediate and long-run demand effects of changes in fares and service levels.

The social welfare balance sheet compares public savings obtained from subsidy reductions with the costs that poorer service levels and higher fares incur on passengers and others. This is a relatively crude measure for the economic impact of the changes in the public transport sector. The approach is not a traditional cost-benefit analysis. Rather, it is an annual summary of the impacts of the changes relative to the base year 1986. The costs and benefits include changes in subsidies, cost efficiency, and effects for passengers and others.

2 TRENDS IN NORWEGIAN URBAN PUBLIC TRANSPORT

Norwegian urban public transport in the period from 1986 to 2003 was characterised by steeply falling subsidies and decreasing costs up to 1997 followed by subsequent increases in subsidies and costs, decreasing patronage except in Oslo, increasing real fares, and stable supply.

Reduced public transport subsidies: The period up to 1997 was one with substantial cuts in urban public transport subsidies. Subsidies have subsequently increased again. This is illustrated in figure 2. We see that 1997 is a momentum for a major policy shift.

In total, the annual public transport subsidies in the 8 urban areas were reduced by around 20 percent from about NOK 1.5bn in 1986 to NOK 1.2bn in 2000, and 32% per vehicle kilometre. As a proportion of costs, subsidies fell from just under 50 percent in 1986 to about one-quarter in 2000 (weighted average). However, there is great variation between individual cities. With two exceptions (Kristiansand and Akershus) subsidies declined steadily till about 1997.

Trondheim has had the largest subsidy cuts. By 2000 subsidies were down by an astonishing 97 percent, measured per vehicle kilometre. Bergen experienced a similar development until 1997, but has benefited from rising subsidy levels since. The subsidy reductions have rendered Bergen and Trondheim with subsidy levels that in 2000 covered only 7 and 3 percent of operating costs, respectively. These levels place Trondheim and Bergen among the European cities with the lowest level of subsidies and the highest rates of farebox recovery.

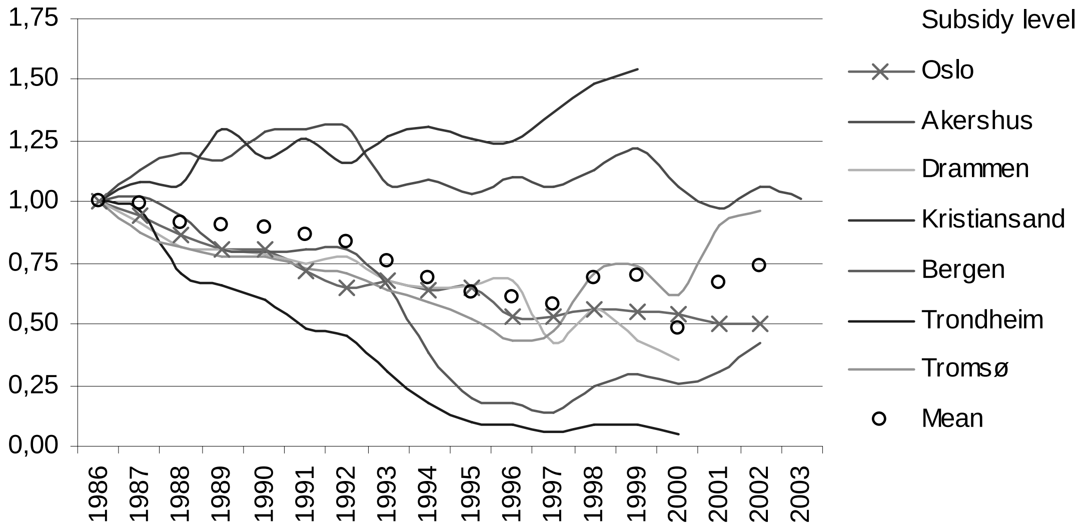

Figure 2: Trends in subsidies as percentage of operating costs. 1986=1.00. The model is understood thus: If subsidies fall from 50% of costs in 1986 to 25% of costs in a given year, then the index will be 0.5 in that year.

Cost efficiency gains and losses: Our analyses of operators' productivity performance indicate that the potential for cost efficiency gains has been exhausted. Average costs per vehicle-kilometre fell by 14 percent between 1986 and 1997. Since then, average costs have increased again. See figure 3.

The cost reductions in the early 1990s coincide with the changes in the Transport Act of 1991, which allowed for competitive tendering of public transport operations from 1994, and which justified substantial cuts in public transport subsidies. As we see, the adjustments with cost savings started to accelerate even before the threat of competitive tendering became real from 1994 onwards.

The developments in cost efficiency gains also coincide with the changes in subsidies. A preliminary analysis shows, however, that subsidies only to a very limited degree explain variations in costs. In other words there is little evidence of cost leakages if subsidies are increased, or that subsidy cuts alone will bring about efficiency gains.

The change of trend in 1997 can have been brought about for several reasons. There is convincing evidence (se e.g. NTP 2003) that much of this cost increase after 1997 is related to the postponement of necessary investments in fleet and in infrastructure.

The efficiency gain and subsequent loss is therefore to some extent a result of public sector accounting principles. Another possible reason for the rapidly increasing costs after 1997 can be found in Atco (2001/2/3), who monitors the public transport tendering market. They find increasing costs of tendered bus services and see this in relation to declining competition for each tender. Fearnley and Carlquist (2001) listed increases in fuel prices and labour costs, rising passenger numbers, improved quality standards as possible explanations for the same shift.

The overall conclusion is nevertheless that substantial gains were obtained in the early 1990s - partly due to the disciplining effect of the threat of tendering, but definitely not as a result of subsidy cuts alone. The scope for further gains was exhausted and costs have increased sharply since the late 1990s. As a result, the average operating costs in 2002 lay only about 6 percent below the 1986 level.

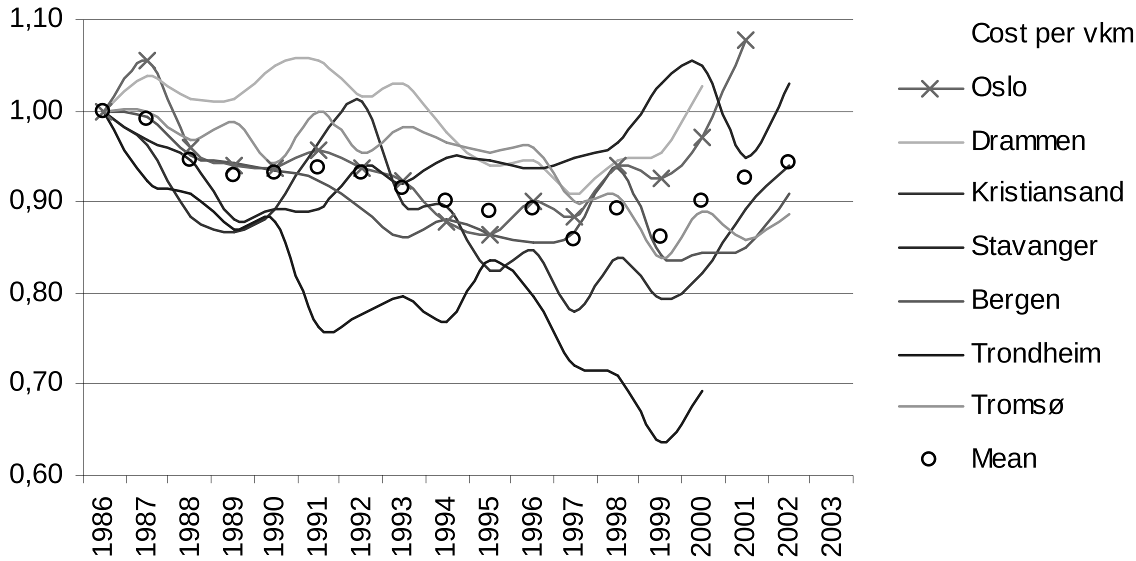

Figure 3: Trends in operating costs per vehicle-kilometre. 1986=1.00.

Major fare increases: Fare levels, calculated as the average farebox revenue per passenger trip, have increased steadily in most areas. In 2002 fare levels were on average 21 percent above the base year level in 1986. Bergen, which experienced major subsidy cuts, also experienced the largest fare increases: 57 percent in real terms. The only exception is Kristiansand where fare levels fell by about 20 percent. This is illustrated in Figure 4.

If we consider the fare level as the price per passenger kilometre, rather than per trip, it is found that fares have not risen as dramatically in Bergen as it may seem from the first look at it. There is also a trend towards longer journeys, which due to the zonal system are more expensive.

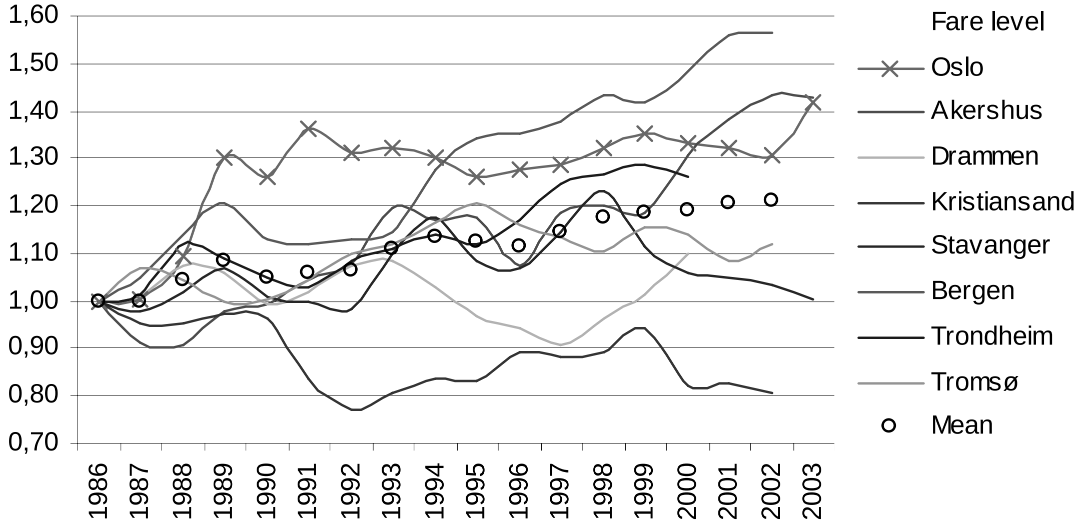

Figure 4: Trends in fare levels, calculated as total fare box revenues divided by number of passengers. 1986=1.00.

Supply has kept up with population growth: Supply, measured by mileage (vehicle kilometres), is in fact rising in line with increasing population. This means that the bus companies in the eight urban areas produced around 18% more vehicle kilometres in 2002 than in 1986, which is equal to the population growth. This service enhancement is a benefit to all passengers. Service levels fell in Bergen, Tromsø and Akershus during the period.

Patronage is falling: On average demand (measured in passenger trips per capita) fell by 13% during the first 6 years of the period. See Figure 5. Since then demand has been quite stable in most areas.

Oslo experienced a long period of sustained growth after 1992. One reason is that since the early 1990s service quality has increased substantially in Oslo, due to the integration of eastern and western metro networks and successful customer orientation schemes.

In Bergen we see the adverse demand effects of service deterioration and fare increases, which add to the negative effects on public transport of a major road investment scheme in the 1990s. Patronage fell steadily during the entire period and lies around 30 percent below the 1986 base year level. These developments must also be seen in relation with the subsidy cuts in Bergen.

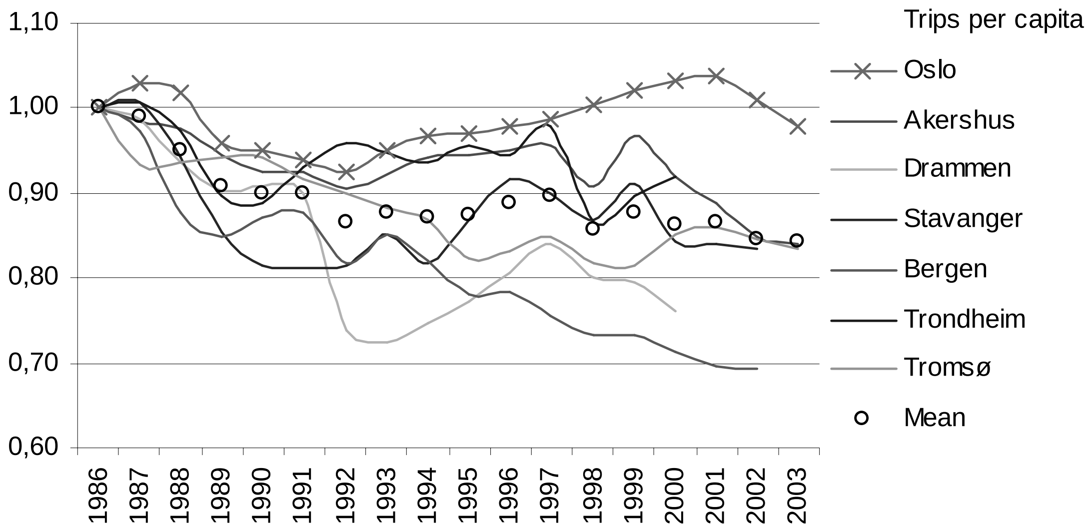

Figure 5: Passenger trips per capita. 1986=1.00.

Profit margins are falling: Figure 6 illustrates the average developments in operating costs, operating revenues and subsidies, calculated per passenger kilometre. From the figure it is evident that the reductions in subsidies have caused deteriorating financial performances. Subsidies fell more rapidly than the improvements in revenues and costs.

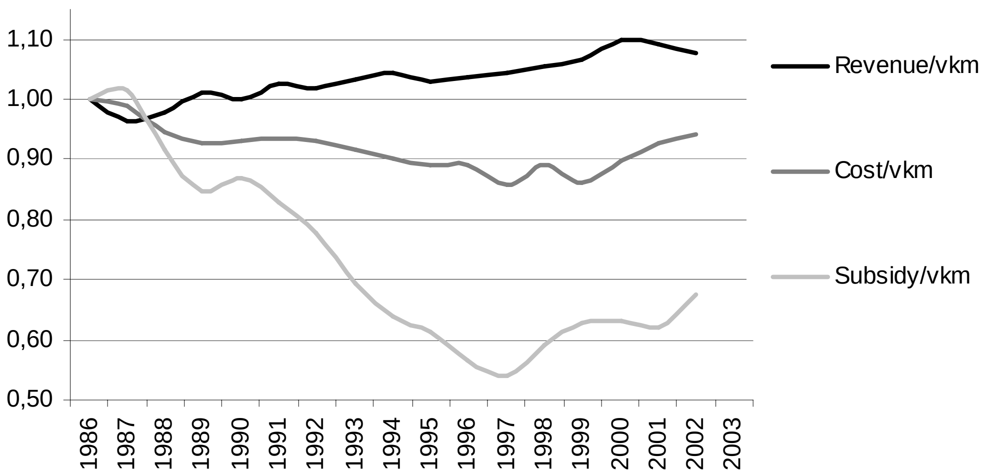

Figure 6: Developments in revenue, cost and subsidy – all measured per vehicle-kilometre. Averages of 8 urban areas, fixed prices. 1986 = 1.00.

Volatile market conditions. The private car is often the most realistic alternative to public transport. The developments in car costs are therefore important determinants of public transport patronage. Figure 7 illustrates how petrol prices and public transport fares have developed since 1986. Both have increased in real terms, but the petrol price fluctuates far more than the public transport fare. Until year 2000 the relative prices developed in favour of public transport. A political decision to cut the "unreasonably high petrol taxes" in 2000 changed this picture. This decision is a likely explanation for the drop in public transport demand around that time.

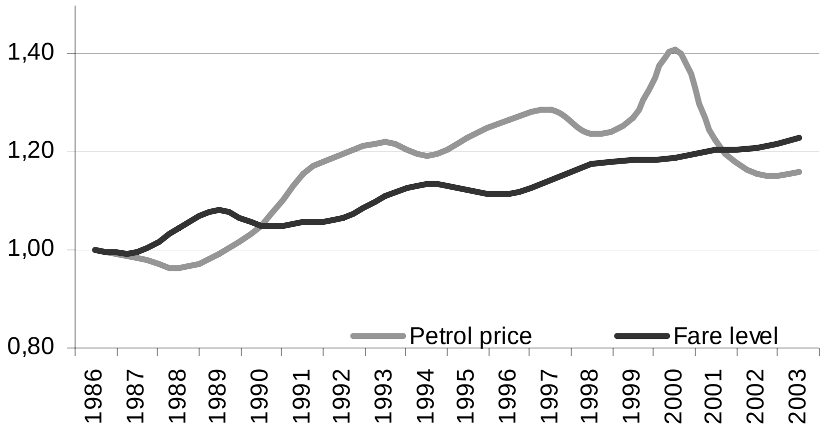

Figure 7: Development in petrol price and average public transport fares. Fixed prices. 1986=1.00

3 AGGREGATE DEMAND MODEL

Three different aggregate demand models have been applied to analyse the effects of income, fare levels, service, and petrol prices on demand for public transport. The main model is a constant elasticity model in first differences. We have calculated the following elasticities (table 1):

Table 1: Elasticities for urban public transport in Norway. Dependent variable: Passenger trips per capita per year.

Variable	Elasticity
Income (GDP/capita)	-0,39*
Petrol price	0,12
Fare	-0,33
Vehicle-km	0,44

* Not significant at 5% level

Our estimates fit relatively well with common assumptions about urban public transport in Norway. The fare elasticity estimate of about -0.3 is however somewhat lower than expected. The cross price elasticity with respect to petrol price confirms the fact that petrol tax cuts contributed to a drop in patronage around year 2000.

Within our model, fare and service levels are the only explanatory variables that are controlled by the public transport sector. We have used this model to estimate the partial and combined effects of the changes in fare and service levels on demand. With the exception of Kristiansand, fare increases have caused declining demand in all cities. There is more variation in the effects of changing service levels. In some cities improved service levels have to some degree offset the negative effects of fare increases, whilst in others the combined action of deteriorating service levels and increasing fares have reduced demand even further.

Figure 8 shows how fares and service levels have influenced total demand for public transport in the 8 urban areas. It shows that relative to 1986 total demand in 2002 was reduced by about 8 percent as a combined result of changes in fares and service levels. This negative development adds to the negative effects of increasing household incomes and, in recent years, the falling petrol prices.

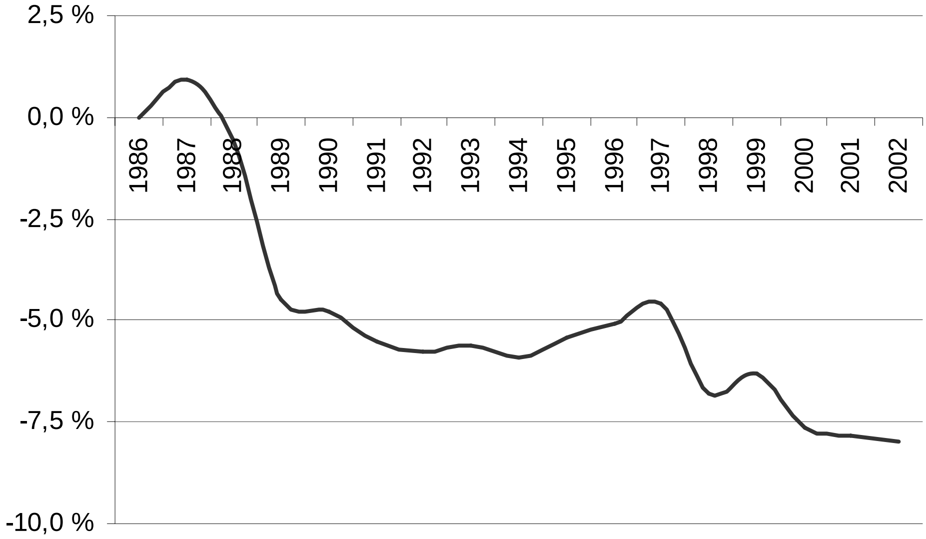

Figure 8: Effects on total demand of observed changes in fares and service levels in 8 urban areas.

In order extract more information from the data, and to obtain area-specific fare elasticity estimates, we specified a semi constrained model. In this kind model it is assumed that the demand elasticities of all other variables are the same in every area, and that only the fare elasticity varies between the areas. The model output is provided in table 2.

Table 2: Constant elasticity model with area-specific fare elasticities. Dependent variable: Passenger trips per capita per year.

Variable	**Elasticity**
Vehicle km	0,43 *
Petrol price	0,12 *
Income	-0,03
Fare:	
• Oslo	-0,22
• Akershus	-0,12
• Drammen	-0,63 *
• Kristiansand	-0,42 *
• Stavanger	-0,33 *
• Bergen	-0,38 *
• Trondheim	-0,07
• Tromsø	-0,49 *

* Significant at 10% level

There is a noticeable difference in price elasticity estimates between the areas. Three estimates are low and not significantly different from zero. Those are Oslo, Akershus and Trondheim. These low estimates correspond well with a previous study which found low fare elasticities in the Greater Oslo region (Hammer 1993), and with the general view that fare elasticities are lower in larger urban areas. However, the low and insignificant estimates may also point in the direction of other omitted variables which have had greater effect on demand. That could e.g. be changes in service quality. In sum the area-specific elasticities seem plausible and provide improved understanding of variation in demand effects in different urban areas.

A third model specification is chosen in order to gain insight to the dynamics of demand. It is reasonable to assume that a proportion of the passengers are not able to respond immediately to a fare change. It takes time, for example, to change location of workplace or dwelling, to adjust car ownership and driving licence possession, or to change travel habits. These are examples of adjustments that may take years to materialise.

A dynamic model helps understand this lagged adjustment in demand. A partial adjustment model is specified for this purpose. Table 3 shows the estimated short and long run elasticity estimates. Short run means here the effects that materialise within the same year, and long run means total effect. We shall use this model to show how long time the "long run" actually is.

Table 3: Estimated short and long run elasticities

Variable	Short run elasticity	Long run elasticity
Veh.km	0,20 *	0,43 *
Fare	-0,23 *	-0,51 *
Income	0,07	
Petrol price	0,12 *	0,27 *

* Significant at 5% level

We can deduce from the table that long run effects are 2.2 times as large as the short run adjustments. This means that less than half the demand response can be observed within the year in which the changes take place. There is in other words considerable delay in passengers' response to changes in fares and service levels.

The year by year demand effects of a thought fare increase of 10% in year 0 are shown in figure 9. The figure shows that the annual effect diminishes rapidly and after 5 years there is no observable effect. The accumulated effect increases during the first couple of years and reaches its limit value of -5.1%, which is the estimated long run effect (since 10*(-0.51) = -5.1), after about 6 years.

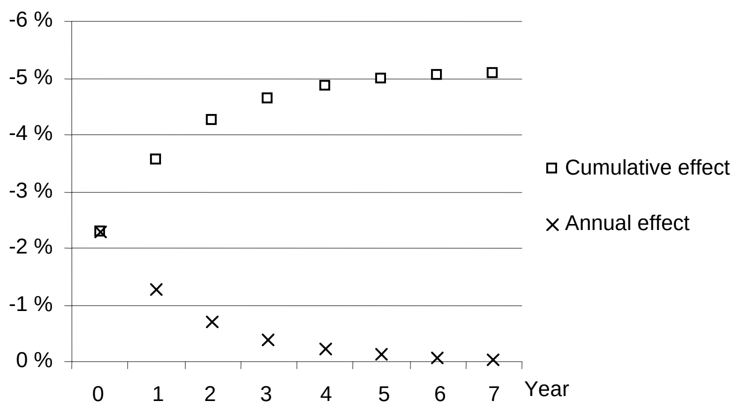

Figure 9: Annual and accumulated demand effect of a 10% fare increase in year 0.

4 SOCIAL WELFARE BALANCE SHEET

The social welfare balance sheet describes the developments in the public transport sector over the period 1986 to 2003. Here, we compare subsidy savings with other changes in the sector. The balance sheet includes welfare effects (including marginal external costs) of modal shifts, changes in vehicle-mileage, service frequency, operating costs and fares. The net effect of these changes constitutes an indicator for social welfare changes. All prices are presented in NOKs, and converted into 1998 values. In 1998 €1equalled approximate NOK 8.33.

Quality improvements are not taken into consideration. Such effects are difficult to quantify. This is a limitation of our analysis, especially as quality measures can be seen as a consequence of subsidy reductions. Carlquist (1998) found that reduced subsidies have led to an increased average age of buses and may have had a negative impact on regularity, thus leading to deteriorating quality. On the other hand, subsidy cuts can have led to more market orientation and quality improvements.

Several accumulation principles have been considered. In our analysis, all calculations are related to 1986 as the base year. E.g. if subsidies are NOK 50 million in 1986, NOK 25 million in 1987 and NOK 40 million in 1988, table 4 describes our accumulation principle:

Table 4: Illustration of accumulation principle

	1986	1987	1988
Subsidy	50	25	40
Change since 1986	0	-25	-10

We also present a total accumulation, i.e. in the above example the total accumulated subsidy saving, related to 1986, would be (25+10)=35.

For simplicity, all positive figures relate to savings or benefits, and all negative numbers are costs.

The following sections discuss the components which are included in the analysis:

- Savings from subsidy reductions (public purse savings)

- Savings in operating costs
- Fare changes (costs for passengers)
- Frequency change costs (waiting time)
- External costs of modal shift to car and of increased supply

These effects are summarised as a total welfare effect.

Subsidy Changes. It is assumed that a reduction of subsidies (measured in fixed prices) equals an identical social welfare saving. We have not included shadow prices of public spending. Figure 10 shows the aggregate change in subsidies. The accumulate public purse saving over the entire period is NOK 5,7bn.

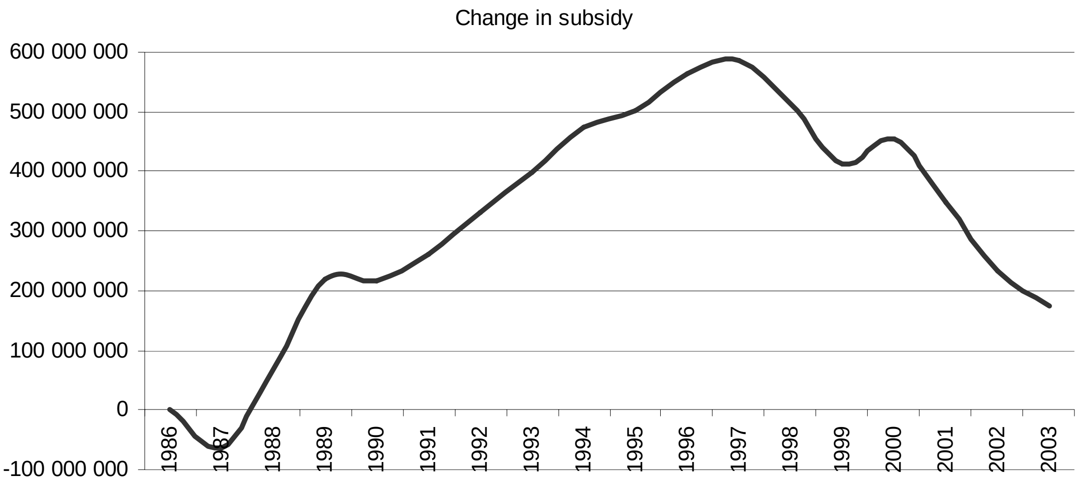

Figure 10: Savings of reduced operational subsidies to public transport 1986 – 2002. All figures relate to base year 1986. NOK in fixed prices.

Operating Cost Savings. Operating cost savings are real efficiency gains. We see from figure 11 that up until 1997 there were considerable cost efficiency gains to be achieved in the urban bus markets. The total gain over the period is NOK 2.5 billion.

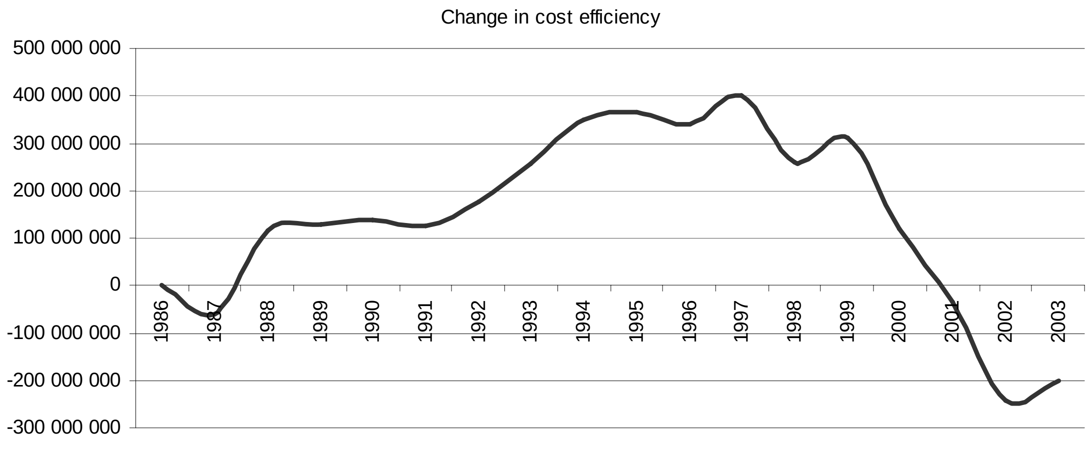

Figure 11: Aggregate savings of reduced operational subsidies to public transport 1986 – 2002. All figures relate to base year 1986. NOKs in fixed prices.

Fare Increases. If savings from subsidy reductions lead to an equal fare increase, social welfare is unchanged although the financing burden has been transferred from the public purse to the passengers. Thus, once subsidy is included in the balance sheet, then user payments must be included as well. We have calculated the costs for existing passengers in a given year, due to real fare increases (measured by revenue per trip) as compared to 1986. We have assumed that a NOK 1 fare increase reduces passengers' welfare by NOK 1. Figure 12 shows the aggregate change in user payments. The total welfare effect is negative: -NOK .8bn. There is no sign of any direct effects of the shift in subsidies on fare levels.

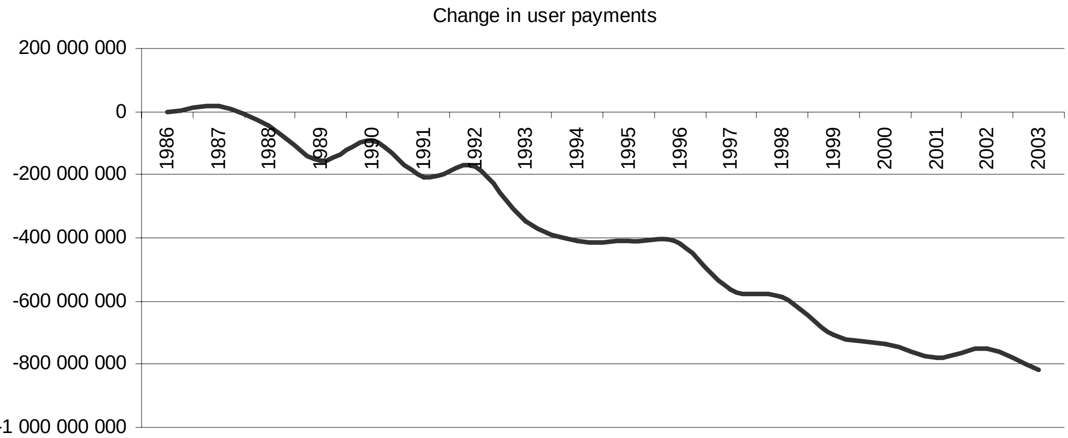

Figure 12: Changes in user payments 1986 – 2002. All figures relate to base year 1986. NOK in fixed prices.

Modal Shift and Increased Bus Supply. Service and fare level changes will influence demand for public transport, and therefore also car traffic. Increased car traffic involves a number of external costs. Eriksen, Markussen and Pütz (1999) studied marginal external costs of transportation. Their figures include global and local pollution, noise, congestion, accidents and infrastructure wear. Our definition of social welfare thus includes environmental costs. A more thorough analysis would have to consider the proportion of peak to off-peak traffic. Fearnley and Nossum (2004) analysed transfers from use of private car to public transport. For 11 major urban areas they found that the average proportion of new passengers that originally used a private car was 42.7%. It is therefore assumed that 42.7% of all new passengers previously travelled by private cars, and similarly that 42.7% of patronage reductions are lost to private cars.

Our analysis includes the changes in patronage which are caused by changes in fares and bus service levels only. The aggregate demand model is used to estimate this. Thus the analysis includes only factors within the operators' range of control.

It has been difficult to make good calculations for the change in public transport vehicle kilometres that are caused by demand changes. We have chosen to include external costs of the entire production increase. The reason for this is that we do not know, based on the aggregated figures, how many passengers a departure must lose in order for the departure to be withdrawn. There is no clear pattern in the data. However, the data indicate that supply is relatively unchanged despite demand changes. This may also explain why kilometre production per capita on average has been fairly constant despite fall in demand. Therefore we have assumed that the cost of transferred traffic from public transport to the private car is merely the cost per new car kilometre, and that the public transport production will be maintained. This assumption may be incorrect for individual cities, but seems realistic for the seven cities aggregated.

Increased bus mileage has caused external costs that sum up to NOK623 million over the period. Modal shift from public transport to private car has caused a similar welfare loss of NOK572. The total "external cost" of the changes is therefore a welfare loss of about NOK 1.2bn.

Waiting Time Changes. A less frequent service implies longer waiting times and therefore costs for passengers. There are several problems concerning these calculations, which need to be mentioned. One is the introduction of service lines for the elderly and disabled. This yields a less frequent service on average, but on the other hand average walking distance will decrease. Another weakness is that frequency estimations based on network kilometre per vehicle hour, and travel surveys showed quite different patterns. This might be due to inadequate sample size for the surveys, or that the network kilometre data was unreliable. Despite these weaknesses, we have included this component as there are substantial variations between the cities and we believe we have identified the direction of change for the cities. We have applied a valuation of waiting time of NOK 0.384 per minute (Nossum 2003 – converted into 1998 values). There is great variation in the changes in waiting times both between the areas and over time. In some periods waiting time has increased and in other periods it has been reduced. The accumulated effect of changes in waiting time is negative but small; minus NOK 309m.

Total social welfare effects. Table 5 summarises the welfare effects over the period 1986 to 2003. The figures are split between cities and between types of impact.

Table 5: Accumulated costs and benefits/savings in NOK millions over the period 1986 to 2003 in the eight urban areas. Positive figures are welfare gains; negative are costs.

Welfare effects of:	Oslo	Akershus	Drammen	Kristiansand	Stavanger	Bergen	Trondheim	Tromsø	Sum
Change in subsidy	4 457	-1 066	183	-97	-155	987	1 255	131	5 694
Change in cost efficiency	682	-468	-1	234	128	779	1 069	125	2 548
Change in user payments	-4 364	-1 877	143	58	-91	-544	-391	-125	-7 193
Change in waiting time	-133	392	-194	-229	59	n/a	146	267	309
External cost of buss mileage	-294	-69	78	-96	-121	-27	-72	-23	-623
External cost of shift to car	-162	-244	-27	24	-5	-123	-15	-19	-572
Total Social welfare	185	-3 332	182	-107	-186	1 073	1 992	355	163

The single largest effect in the balance sheet is the inclusion of Akershus, which brings in large welfare losses. Akershus County has been severely affected by new requirements for school transport, which is costly to produce and which necessitates large subsidies. Therefore, despite increased subsidies and increased user payments, Akershus has only provided marginal user benefits in terms of service enhancements (waiting time gains).

We also see that Oslo has had the largest subsidy cuts, totalling NOK 4.5bn, which almost entirely can be said to have been transferred to passengers who have paid an extra NOK 4.4bn over the period. Similar, but far smaller transfers of costs from the public to the passengers can be seen in Drammen, Bergen, Tromsø and to some extent in Trondheim.

Nearly all the urban areas have experienced cost efficiency gains and at the same time considerable external costs of increased bus mileage and car use.

Only three of the areas have negative total effects and only Akershus has had substantial welfare losses during the period. Bergen, Trondheim and Tromsø on the other hand stand out with considerable welfare gains.

Fearnley and Carlquist (2001) showed that in the first half of the period 1986-99 there was a substantial saving due to reduced subsidies, but almost three quarters of this was offset by other components, in particular transfer of costs to passengers (increased fares). In the second half of the period, the possibility to reduce subsidies was more limited, most likely because the potential for cost efficiency gains was diminishing, they argued. The fares rose substantially, and the external costs of increasing production also increased. This led to a net loss in the second period, according to them. Their conclusions go well with figure 13, which illustrates the annual total welfare effects in the 8 urban areas.

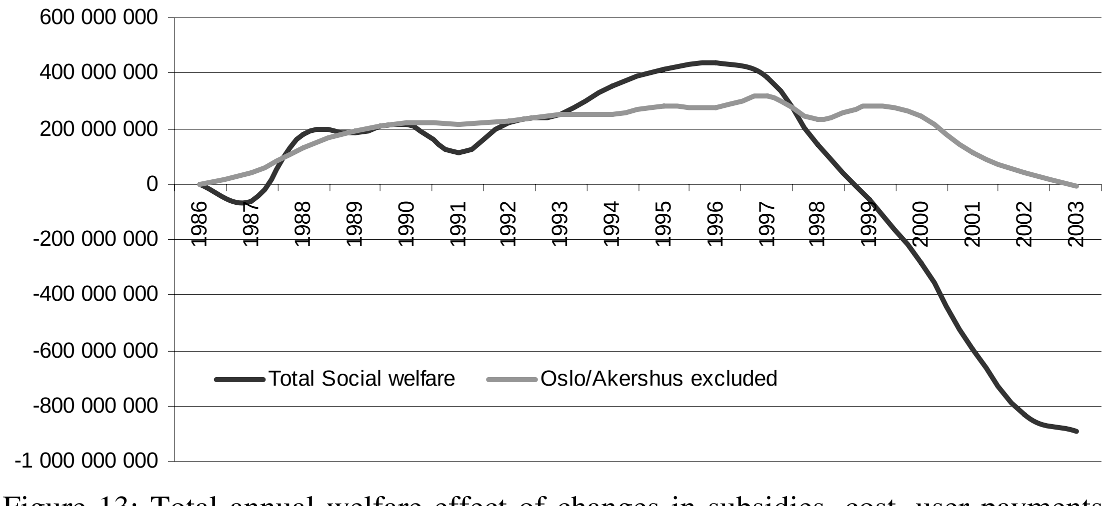

Figure 13: Total annual welfare effect of changes in subsidies, cost, user payments, waiting time and external effects in the eight urban areas and with Oslo/Akershus excluded. All figures relate to base year 1986. NOK in fixed prices.

Greater Oslo (Oslo and Akershus) represents more than 50% of the population in the eight urban areas studied. In addition, Oslo has a public transport system comprising bus, tram and metro networks, whereas the other cities with small exceptions have bus systems only. If we separate Greater Oslo from the six other cities, we see from figure 10 that the same pattern as for all the areas materialises. However, after 1997 Oslo and Akershus sustained severe welfare losses as opposed to only moderate losses in the other six cities.

In total, and given the reservations presented, there seems to be a positive relationship between subsidy cuts and social benefit. Although subsidy cuts have meant a considerable transfer of cost to the passengers, there has also been the disciplining effect on operating costs during the period up to 1997. This conclusion is in part contrary to previous studies of the developments of Norwegian urban public transport by Norheim and Carlquist (1999) and Fearnley and Carlquist (2001). The latter concluded more vaguely that "savings for the public purse due to subsidy reductions will be offset by changes which in part are due to the subsidy reductions".

5 CONCLUDING REMARKS

We have studied trends and developments in Norwegian urban public transport in the period 1986 to 2003. Previous studies have shown a long lasting trend of diminishing subsidies to urban public transport. This trend has changed and total subsidies have in fact increased steadily and rapidly since 1997. Despite this, fare levels continue to increase. Therefore, considerably more resources have gone into urban public transport in the last couple of years. Part of this extra money is assumingly financing necessary maintenance costs and investments that were postponed due to the strained situation caused by subsidy cuts.

The data has enabled us to develop relatively robust estimates of demand elasticities. The overall fare and service elasticities are estimated to -0.33 and 0.44 respectively. And area-specific fare elasticity model indicates that the size of the elasticity is inversely related to the size of the city. Larger cities seem to have less price sensitive demand. A dynamic model shows that the total effects of changes in fare or service levels are about 2.2 times as large as the within-year effect; there is considerable delay in passengers' response.

In particular because of rapidly increasing fares, public transport patronage has fallen steadily during the period. The demand model shows that changes in fare and service levels have caused a passenger loss of about 8 percent.

Our analyses of operators’ productivity performance indicate that the potential for cost efficiency gains has been exhausted. Average costs per vehicle-kilometre fell between 1986 and 1997. Since then, average costs have increased again and are approaching the 1986 level. A likely reason for the cost reductions in the 1990s is the threat of tendering which disciplined operators and forced them to prove that they delivered value for money even without competition.

The public purse savings from reduced subsidies in seven Norwegian cities have had consequences for other actors. The operators have become more cost effective, although probably mostly because of the disciplining effects of competition. This indicates that it was “correct” to reduce subsidies. The passengers have carried the brunt of the cost transfer, mainly through increased fares but also through reduced service quality. Society in general has also had to bear costs due to a modal shift from public transport to private car traffic.

The year 1997 has been a momentum for noticeable shifts in trends with respect to subsidies and operating costs. The developments since 1997 are dramatic. Social welfare declines rapidly as a joint effect of increases in subsidy payments, operating costs and fares. Public transport costs seem to be escalating, although a major reason for this is the new requirements for school transport in one area.

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