QUALITY INCENTIVES – QUALITY OUTCOME IN PROCURED PUBLIC TRANSPORT, CASE STUDY STOCKHOLM

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INTRODUCTION

This paper contains first results and interpretations of analyses of possible relationships between quality incentives and quality outcome for procured public transport services by the Stockholm County Public Transport Authority (SL).

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In 1988 a new act in Sweden allowed (but did not mandate) local and regional public transport authorities to procure public transport services under competition. The authorities are all in charge of planning, i.e. tactical decisions, but can thus since then procure the operations under competition.

In 1991 SL launched its first competitive tenders. Between 1989 and 1991 the in-house operator of SL was given a couple of years for strengthening of its competitiveness in order to be able to meet the coming competition from private operators. In fact, operating costs went down some 30 percent before the first tender round, by the mere threat of competition.

Gothenburg in Sweden applied a similar procedure with similar results. In 2006 all local and regional public transport authorities in Sweden has procured services under competition.

More information on how the Swedish policy on (land-based) public transport evolved around 1990 is found in Jansson and Wallin (1991).

In the longer run since 1991 competitive tendering in Sweden has reduced costs by some 5-10 percent on average. The cost outcome of procurement of bus transport in Stockholm, and in Sweden in general, has been the topic in several studies (e.g., Jansson, 1993; Alexandersson et al., 1996; Alexandersson and Pyddoke, 2003).

Research in terms of quality, however, has not been reported very much. This is a certainly a deficiency. Not much seems to be reported in the literature on effects of incentives for quality

improvements either. That is at least one conclusion drawn by Jansson and Pyddoke (2007), a literature study on behalf of the Stockholm County Public Transport Authority (SL). This paper makes an effort to provide a contribution in the field: quality incentives – quality outcome.
SL is the public transport authority in Sweden that has experimented with the largest number of incentives and has the largest number of quality measurements. That is the reason why SL is the best candidate in Sweden for analyses of quality incentives - quality outcomes.

The reason for these experiments is of course the belief that quality incentives will lead to quality improvements. The main finding in this paper is that the incentives do not work satisfactorily. Probable reasons may be that the incentives are too weak, too little related to the passengers' valuation of quality and that there are, at least so far, unknown factors that we have not taken into account but that affect the performance of the operators.

Section 2 includes a principal discussion on the economic rationale for various incentives and how SL has dealt with incentives historically. Section 3 describes the methodology employed and structure of analyses. Section 4 presents the results structured according to the various incentives. Main conclusions are presented in section 5. The appendix includes listing of the type of data that the Stockholm County Public Transport Authority (SL) collects for quality measurement purposes.

DISCUSSION OF PRINCIPLES

Incentive Forms

We assume that a public transport authority, as SL, is welfare maximising, while competing operators are profit maximising.

The economic rationale for incentives in contracts is to make the operator act so that one achieves the largest possible social net benefit. Incentives are thus often regarded as important tools by public transport authorities, in order to make procurement of public transport services work satisfactorily.

In this paper we analyse gross-cost contracts since these are used by SL. Common incentive schemes when gross-cost contracts are used are related to:

- number of passengers
- revenue
- quality in terms of departures carried out
- quality in terms of punctuality
- quality in terms of cleanliness
- quality in terms of staff behaviour
- quality in terms of information.

Incentives related to number of passengers or revenues are problematic in two senses.

The main problem is that it is very difficult to know the reason for the changes in the number of passengers or revenue. The reasons may be for example: changes in the land-use pattern, changes of cost of driving cars, measures taken by the transport authority, measures taken by some operator that affect other operators' demand.

The other related problem is that the transport authority may avoid undertaking (valuable) measures in order not to disturb the distribution of demand between operators.

All in all it is difficult, if not even impossible, to derive the exact relationship between possible measures undertaken by the operator and demand changes. The conclusion is that one should be very careful and restrictive if demand or revenue incentives are considered.

More passengers should be no main goal. This is valuable only as long as it means an increase of net social benefit. The benefit of more passengers is related to higher revenues, less car traffic and thus less pollution. These effects should, however, be taken into account in a cost-benefit analysis.

Theoretical arguments and numerical examples of shortcomings of demand and revenue related incentives are found in for example Jansson (1997).

Quality incentives

Quality incentives with respect to for example departures carried out, punctuality, cleanliness, staff behaviour, information, punctuality etc. are easier to deal with. Hereby one needs to rely on controls of staff, technical recordings and complaints from passengers.

SL in Stockholm applies all these sources. Complaints and opinions from passengers are collected by telephone, e-mail and interviews. SL also uses “mystery shoppers”, who are plainly dressed consultants who travel as passengers with the task to examine quality in various respects. A list of the quality measurements used by SL is found in the appendix.

In earlier work on behalf of the Stockholm County Public Transport Authority (SL), Jansson (2002) and Eriksson and Jansson (2002) concluded that the quality incentives used by SL were too “toothless”. The amount of money for bonus and penalties were very small compared to the contract sums, implying that one could not expect the driving force in these incentives to be strong.

Another problem found was that incentives were mainly related to arbitrarily chosen percentage figures. Bonus or penalty was paid if a quality parameter was over and under respectively a certain objective. A certain bonus is paid if the accepted number of late departures operator is below 95 percent, another, higher, bonus is paid if the accepted number of late departures operator is below 96 percent etc. A certain bonus is paid if, according to interviews, 75 percent of the passengers are satisfied with the service, another, higher, bonus is paid if 80 percent of the passengers are satisfied with the service etc. Similar percentage rules are sometimes used also for penalties.

Of course such percentage rules may work, if they work at all, in the right direction. But the problem was and is that these rules in many cases have no connection to the passengers’ valuations of quality (willingness to pay). The rules also ignore that it is not only the number of late departures that matters, but also how late they are.

In this context Jansson (2002) also discusses the trade-off between valuation and cost. The authority naturally wants to pay the operator the minimum amount for achieving a certain quality level, but two conditions are necessary for a quality improving measure to be undertaken from a welfare point of view:

- The benefits to the passengers must exceed the cost for the operator,
- The payment to the operator should not exceed the passengers valuation of the quality aspect

If condition 1) is satisfied the payment should ideally be just above the cost.

A problem is now that the authority hardly ever knows the cost for the operator to improve quality. This asymmetric information may, however, not be that serious. If bonuses and penalties for improving and worsening quality reflect the willingness to pay, then the operator will make a decision that increases welfare. If the cost for the operator for improvements exceeds the bonus, the improvement measure will not and shall not be undertaken. If the cost for the operator for improvements is below the bonus, the improvement measure will and should be undertaken. Another matter is that one cannot easily know whether a welfare optimum is reached.

So far most of the quality incentives used by SL are of the percentage style, without connection to valuations of the passengers. There is, however, one exception that is discussed in the section below.

Quality incentive with respect to punctuality

Many interviews with SL passengers indicate that lack of reliability in terms of departures and punctuality is the most serious problem.

On behalf of SL, Jansson (2004) carried out a work on improvements of incentives related to punctuality. First we describe briefly the recommendation by Jansson and then the new incentive scheme that was actually implemented by Stockholm County Public Transport Authority (SL) for the contracted area Södertälje in 2006.

Recommendation

The same principle for bonus and penalty can in fact be used for:

- late departure,
- early departure,
- cancelled departure.

All of these deficiencies cause delay and may thus be called delay.

The recommendation is that the operator should be rewarded for improvement based on the passengers valuation of punctuality and if symmetrically penalised for degradation of punctuality.

The passengers perceive waiting time at stops as more uncomfortable than riding time. Waiting time when the bus is late is perceived as normal wait time at the stop. Too early departure means that the passenger has to wait the whole interval till next departure.

As the basis for the cost of delay the value of ride time was assumed to be 2 € per hour. The value of waiting time at the stop is assumed to be 3 times higher, that is 6 € per hour, i.e., the weight of waiting time is 3 times larger than riding time. Several studies indicate that the value of delay time is much higher. It was here assumed to be on the average the double

compared to normal wait time, i.e., 12 € per hour. The assumed weight of delay time was thus 6 times larger than the value of ride time.

The value of delay time was also assumed to increase progressively with the delay time. The weight of delay time should be 3 when the delay time is zero, i.e., equal to the weight of normal wait time. The weight 6 was assumed to relate to 8 minutes delay time. When the delay grows over 8 minutes also the weight grows progressively.
A delay smaller than one minute was assumed to cause so little nuisance that it should not give rise to penalty.

Implementation

Stockholm County Public Transport Authority (SL) applies a principle that is similar to the recommendation since 2006 for the contract area Södertälje. SL thus relates the bonus and the penalty to the passengers´ valuation of delay per minute. The difference is that they do not take into account a progressive cost but a linear one, which they thought was easier to understand for the operators. 0.5 minutes delay gives rise to no bonus or penalty. Delays less than 0.5 minutes give bonus and delays over 0.5 minutes give penalty.

SL acquires their information about delay minutes from their automatic traffic measurement system (ATR). This system measures the number of boarding passengers and the time at each stop for a sample of departures.

METHODOLOGY AND STRUCTURE OF ANALYSES

Method

In this preliminary report on some exploratory regressions we have used no sophisticated econometric methods. We have used plain ordinary least squares regression techniques to estimate the effects of incentives and to control for a number of variables that may influence the outcome measures.

One shall keep in mind that for most estimations the incentive variables are dummy variables, so that all other changes that may coincide with the period designated by a dummy variable will be caught by the dummy.

Structure

We present the results of the analyses with respect to the different incentives that have been used as explanatory policy variables. These are the following variables describing incentives:

- Punctuality, measured either as late departures (LATE) or timely departures (TIMELY)
- Cancelled departures (CANCELLED)
- Bus at departure stop in advance (ADVANCE)
- Validation of tickets (VALIDATION)
- Cleanliness, staff behaviour, information (CLEAN, STAFF, INFO)

As complementary, exogenous, explanatory variables we have used:

- The number of days in a month with more than 5 mm of precipitation in Stockholm (PRECIPITATION)
- Speed (bus only), except bus stops, used as a proxy for congestion (SPEED)
- The number of boarding passengers (PASSENGERS)

The reason for using the variable PRECIPITATION is the idea that increased precipitation, on average, may decrease the timeliness of public transport, for buses all year round and for rail in wintertime (snow).

The reason for the variable SPEED is the idea that more congested streets may lead to increased difficulties in producing timely departures for buses.

The reason for the variable PASSENGERS is the idea that more passengers boarding will, on average, also delay the service in question.

We have analysed possible relationships quality incentives – quality outcome for the following contract areas, but not in the same way for all of them:

Bus services

- Råsta-Solna
- Råsta-Sollentuna
- Solna-Sundbyberg
- Söderort

Underground services

- Green line
- Red line
- Blue line

Commuter rail services

The following quality outcomes have been used, but not the same for all analyses:

- Ranking according to passenger complaints (COMPLAINT)
- Punctuality, measured either as late departures (LATE) or timely departures (TIMELY)
- Bus at terminal stop in advance (ADVANCE)

In some cases we have also used the following reasons for cancellations that the operator itself is obliged to report to the authority SL:

- Actions by the Swedish National Rail Administration (Banverket, BV),
- Actions by the operator (OPERATOR)
- Actions by the authority (AUTHORITY)
- Lack of staff (STAFF),
- Lack of vehicles (VEHICLES)
- Track problems (TRACK)

- Other factors (OTHER).

RESULTS

Punctuality

We have analysed the effects of punctuality incentives for bus, commuter trains and underground, on the timeliness of arrivals and departures. These analyses have been done for different sub series of data from 1996 to 2006. In all of the analysed series there have been quantitative or qualitative changes in the form of the incentive. For most of these cases the changes is modelled with a dummy variable taking the value 0 before the increase in intensity of the incentive and the value 1 afterwards. For the commuter trains it has been meaningful to model changes quantitatively as increases in intensity.

Here are the results of the regressions of punctuality on the different variables chosen to model effects of incentives and to control for other circumstances that may influence the operators´ ability to achieve punctuality.

Table 4.1.1: Regression of causes for late departures for Söderort from January 1996 to December 2003

	Coefficients	*t-values*
CONSTANT	116,68	5,06
INCENTIVE LATE	-5,69	-3,63
PASSENGERS	-0,0008	-2,36
SPEED	-2,21	-2,45
PRECIPITATION	0,24	1,00

In this regression punctuality is measured by an index of late departures LATE. So the incentive decreases the number of late departures. It has the “right” sign.

In the following regressions punctuality is measured by an index of timely departures TIMELY.

Table 4.1.2: Regression of causes for timely departures for Söderort from January 2000 to December 2006

	Coefficients	*t-values*
CONSTANT	83,41	15,75
INCENTIVE TIMELY	-0,564	-1,86
PASSENGERS	0,021	1,35
SPEED	0,336	1,93
PRECIPITATION	0,072	1,15

Since the incentive decreases the number of timely departures it has the “wrong” sign.

Table 4.1.3: Regression of causes for timely departures for Södertälje from January 2000 to December 2006

	Coefficients	*t-values*
CONSTANT	87,68	8,89
INCENTIVE TIMELY	-2,99	-4,74
PASSENGERS	-0,09	-2,23
SPEED	0,349	1,38
PRECIPITATION	-0,138	-2,34

Since the incentive decreases the number of timely departures it has the "wrong" sign and with large significance.

Table 4.1.4: Regression of causes for timely departures for commuter trains from January 2000 to December 2006

	Coefficients	*t-values*
CONSTANT	1,01	1,23
INCENTIVE TIMELY	0,016	1,25
PRECIPITATION	-0,106	-1,84

For commuter rail services the incentive has the right sign but not very significant.

Table 4.1.5: Regression of causes for timely departures for underground blue line from January 2000 to December 2006

	Coefficients	*t-values*
CONSTANT	100,9	103,14
INCENTIVE TIMELY	-3,118	-9,55
PASSENGERS	-0,0174	-3,05
PRECIPITATION	-0,0872	-1,72

Since the incentive decreases the number of timely departures it has the "wrong" sign and with large significance.

Table 4.1.6: Regression of causes for timely departures for underground red line from January 2000 to December 2006

	Coefficients	*t-values*
CONSTANT	99,895	47,582
INCENTIVE TIMELY	-4,140	-5,05
PASSENGERS	-0,016	-3,06
PRECIPITATION	0,012	0,10

Since the incentive decreases the number of timely departures it has the "wrong" sign and with large significance.

Except for Söderort and commuter rail services we find a negative effect from the incentives in the above analyses. How can this come, since the incentive itself theoretically should have a positive effect? Even though we try to control for other circumstances that may have adverse effects on timeliness our prime hypothesis is that we have not yet successfully controlled for some important reason for declining timeliness.

We do, however, interpret these results, as an indication that the magnitude of the incentives used so far may not have been large enough to favourably influence the motivations of operators to really change behaviour and produce more timely departures.

Remember that the dummy variable construction of the incentive variable will catch all other changes that coincide with the period designated by the dummy variable.

Let us also comment on the estimated effects of the control variables. We find that SPEED has no significant impact on timeliness, although the estimated coefficient has the "right" sign in the two later estimations.

We find that the estimated sign of the coefficient for PASSENGERS varies and that its significance also varies. In most cases the estimate has the right sign and is statistically significant. Disturbingly we find that more boardings in Söderort has a positive effect on timeliness, but this effect is not statistically significant.

PRECIPITATION seems to affect timeliness in various directions and may not have any real effect.

Cancelled departures

The effects of incentives for cancelled departures on the total number of cancelled departures have been analysed for bus and commuter trains. These analyses have been done for different sub series of data from 1996 to 2006. In all of the analysed series there have been quantitative or qualitative changes in the form of the incentive. For most of these cases the changes is modelled with a dummy variable taking the value 0 before the increase in intensity of the incentive and the value 1 afterwards. For the commuter trains it has been meaningful to model changes quantitatively as increases successively in terms of monetary values.

Below we present the results of the regressions of cancelled departures on incentives and the precipitation to control for a factor that may influence the operator's ability to achieve departures. We have also chosen to present the different causes that the operators are obliged to report for cancelled departures.

Table 4.2.1: Regression of causes for cancelled departures for Söderort from January 2000 to December 2006

	Coefficients	*t-values*
CONSTANT	0,345	4,958
INCENTIVE	0,062	0,963
PRECIPITATION	-0,003	-0,253

Table 4.2.2: Causes for cancelled departures for Söderort from January 2000 to December 2006

	STAFF	VEHICLES	OTHER
Average share of cause for cancelled departures	0,25	0,62	0,12

Both the tasks of manning the vehicles and the provision of functioning vehicles should be tasks that could be performed without hindrance by the operators. Apparently the operator has difficulties to put out staff and vehicles on the road in spite of the incentive.

Table 4.2.3: Regression of causes for cancelled departures for Södertälje from January 2000 to December 2006

	Coefficients	*t-values*
CONSTANT	46,824	5,056018
INCENTIVE	47,237	1,745952
PRECIPITATION	0,250	0,103278

Table 4.2.4: Causes for cancelled departures for Södertälje from January 2000 to December 2006

	STAFF	VEHICLES	OTHER
Average share of cause for cancelled departures	0,32	0,56	0,11

Apparently the operator in Södertälje has had similar difficulties to put out staff and vehicles on the road.

Below we see the regression results for commuter trains.

Table 4.2.5: Regression of causes for timely departures for commuter trains from January 2002 to December 2006

	Coefficients	*t-values*
CONSTANT	1,005	1,23
INCENTIVE	0,017	1,25
PRECIPITATION	-0,106	-1,84

Below we see the reasons for cancellations as reported by the commuter rail operator. In most cases the operator assigns the responsibility to himself. The second largest reason is that the rail track agency has failed in some way.

Table 4.2.6: Causes for cancelled departures for the Commuter trains from January 2002 to December 2005

	OPERATOR	PUBLIC TRANSPORT AUTHORITY	TRACK AUTHORITY	OTHER
Average share of causes for cancelled departure	0,44	0,02	0,39	0,15

The effects of the incentive variables are all positive. That is, the incentives increase the number of cancelled departures. This is clearly the "wrong" sign again. In the two cases of bus contracts the effects of the incentives are significantly different from naught. But in the case of commuter trains it is not.

Again, how can it come that the incentive is negative? We have some data on causes for cancellations given by the operators, for which we have, so far, done only some preliminary analysis.

Remember that the dummy variable construction of the incentive variable will catch all other changes that coincide with the period designated by the dummy variable.

The PRECIPITATION variable appears to have only very weak and insignificant effects on cancellations.

Bus at departure stop in advance

The effects of incentives for a timely appearance at departure point before departure on the total number of minutes in advance at departure stop have been analysed for buses only. These analyses have been done only for period 1996 to 2003. In all of the analysed series there have been quantitative or qualitative changes in the form of the incentive. For these two cases the changes is modelled with a dummy variable taking the value 0 before the increase in intensity of the incentive and the value 1 afterwards.

Below we see the results of the regressions of timely appearance at departure point before departure dependent on incentives and on the variables chosen to control for other circumstances that may influence.

Table 4.3.1: Regression of causes for a timely appearance at departure point before departure in Råsta-Solna from January 1996 to December 2003

	Coefficients	*t-values*
CONSTANT	8,34	2,68
INCENTIVE	0,63	4,16
PASSENGERS	0,000054	0,88
SPEED	-0,23	-2,156
PRECIPITATION	-0,00007	-0,003

Table 4.3.2: Regression of causes for a timely appearance at departure point before departure in Råsta-Sollentuna from January 1996 to December 2003

	Coefficients	*t-values*
CONSTANT	0,27	0,12
INCENTIVE	-0,68	-5,61
PASSENGERS	0,00001	0,03
SPEED	0,11	1,66
PRECIPITATION	0,01	0,53

In this dataset the timely appearance in advance at the departure stop is measured as the total number of minutes in advance. Therefore more minutes are better. We can see that the incentive has one positive and one negative result, both significantly different from nought. The first sign is the "right" sign.

Remember that the dummy variable construction of the incentive variable will catch all other changes that coincide with the period designated by the dummy variable.

None of the control variables SPEED, PASSENGERS or PRECIPITATION appear to have a stably significant effect on this objective.

Cleanliness, staff behaviour and information

In this section we examine the effects of incentives for cleanliness in vehicles, staff behaviour (service attitude) and information on the total number of complaints. These are examined for buses only. The analysis covers the period from 1996 to 2003. In the analysed series there has been a change in the form of the incentive. This change is modelled with a dummy variable taking the value 0 before the increase in intensity of the incentive and the value 1 afterwards.

Below we can see the results of the incentives for cleanliness in vehicles, staff behaviour (service attitude) and information and the control variables on the total number of complaints.

Table 4.4.1: Regression of cleanliness in vehicles, staff behaviour (service attitude) and information in Råsta-Sollentuna from January 1996 to December 2003

	Coefficients	*t-values*
CONSTANT	169,6	0,59
INCENTIVE CLEAN, STAFF, INFO	6,0	0,36
INCENTIVE TIMELY	33,9	2,00
INCENTIVE VALIDATION	-29,7	-2,39
PRECIPITATION	3,9	2,35
SPEED	-9,4	-0,90
PASSENGERS	0,007	2,57

The estimation cannot distinguish the three different incentives as they were implemented simultaneously. The three incentives for cleanliness in vehicles, staff behaviour (service attitude) and information have increased the total number of complaints. This is of course the "wrong" sign again. This effect is, however, not significantly different from nought.

In this estimation we also included the incentives for timely departure and validation of tickets. The incentive for timely departure is estimated to have a positive effect on the total number of complaints, which is obviously "wrong" also. The incentive for validation of tickets is estimated to have a negative effect, which may be interpreted so that passengers do not appreciate too cautious bus drivers.

As in the previous cases remember that the dummy variable construction of the incentive variable will catch all other changes that coincide with the period designated by the dummy variable.

We have not tested for multicollinearity but this should be a small problem as the dummy series are not close.

With respect to the control variables we note that more precipitation has a statistically significant positive effect on the total number of complaints. Increased speed (that is less congestion) reduces the total number of complaints. This estimate is not significantly different from nought. A larger number of boarding passengers increases the total number of complaints. This estimate is significant.

SUMMARY AND CONCLUSIONS

Belief and Aim

A belief held by the Stockholm County Public Transport Authority (SL) and many other public transport authorities in Sweden and other countries is that quality incentives will lead to quality improvements.

The aim of this project is to examine relationships between quality incentives and quality outcome for the County of Stockholm and, based on the results, hopefully be able to recommend certain changes of the incentive structure. The results presented here stem from the beginning of this project, which will last till December 2008. So far we have only analysed data between 1996 and 2006.

Below we provide some more comments from this and an earlier study of ours, interpretations of reasons for the counterintuitive results and finally some issues for further contemplation.

Result of earlier study

In a previous pilot study financed by Vinnova, Jansson and Pyddoke (2005) compared samples of the quality outcome measurements before and after an incentive has been introduced and calculated if the differences in averages were statistically significantly different from naught. If the difference was statistically significant and had the desired sign this could indicate that the incentive had worked well.

The statistical tests for three contract areas suggested that four incentives worked well and had the desired effects and that three incentives did not work well, whereas two incentives did not seem to have any significant effect at all. From this we concluded that the full set of incentives for the whole set of bus contracts may not have produced the desired quality improvements and a positive welfare net. A more definite conclusion on the efficacy of the quality incentives would clearly have been premature from this study, since we had not controlled for other circumstances that may have influenced the outcomes. The study did

however show that both data and methods allow for meaningful evaluation of the design of individual incentives and that these methods could be applied to the whole set of contracts.

Result of on-going study

In the ongoing study we have made an effort to seek ways to control for other factors that may influence the operator's possibilities to achieve the public transport authority's objective.

The results up to now indicate that the quality incentives employed by SL have no or even a negative effect on quality outcome. In theory this effect should of course be positive. Therefore we believe there must be other reasons.

We have found that the operators have difficulties to put in vehicles and staff when and where they should, in spite of the incentives. This fact underpins the suspicion that incentives are too weak, i.e., that the costs for the operator to meet a goal are larger than the penalty for not meeting it.

Interpretations of reasons for counterintuitive results

Below we try to list various hypothetical reasons for the maybe unexpected results of the effects of quality incentives.

- The introduction of quality incentives and quality measurements by SL seems to have proceeded in a somewhat *ad hoc* fashion. There does not seem to have been any conscious plan to evaluate incentives.
- The number of incentives is large and varying and it is not always clear why a particular incentive or design of incentive has been chosen.
- Most incentives seem much too complex and too much related to fulfilment of certain percentages.
- The money value of bonuses and penalties may be too low compared to the cost of actually implementing improving measures.
- Some incentives, mainly the new punctuality incentive, is calculated based on estimates of passengers willingness to pay for waiting and delay time, may need more time till it works satisfactorily.
- Even though we try to control for other circumstances that may have adverse effects on the objectives, our prime hypothesis is that we have not yet successfully controlled for some important reasons for declining timeliness.

Preliminary recommendations and what to do?

As mentioned above in section 2.2 we have indications that the magnitude of the incentives have been significantly below the willingness to pay of passengers. If this is the case incentives may not be large enough to give operators the full motivation to pursue quality to a socially optimal degree. A preliminary recommendation is that SL increases the monetary values of bonuses and penalties to the willingness to pay level.

We do not know the operators costs for achieving the objectives. An advantage when willingness to pay based payments are used is that the authority then does not have to know the costs. Such willingness to pay based incentives are, however, used only for one incentive and in one contract area: punctuality in Södertälje. This new punctuality incentive may be a

possible solution. A preliminary recommendation is that SL introduces more incentives related to willingness to pay.

If incentives do not work as well as they are supposed to, one may have to consider the costs of administrating the incentives in relation to the effects of the incentives A preliminary recommendation is that SL tries to make incentives less complex, which would save costs both for SL and the operators.

An open question is if we have ignored some important exogenous variables that would be possible to include in an analysis of this kind.

An open question is also if there are other studies, which we are not aware of, on the relationship between quality incentives and quality that could help to improve on the analyses.

We will in this study go on with taking in more bus contract areas and we will make use of new incentive and measurement data from 2007 and 2008. We will also try to find more useful control variables. Whether some incentives then tend to work the way they should remains to be seen.

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APPENDIX: DATA COLLECTED BY SL

SL has several different datasets relevant for our purpose. SL has also by itself and by commissioning various consultants conducted a number of studies of quality in bus transport. Therefore data is scattered in several sources. For this project we have also hired the consultant ÅF-Infraplan for collection and generation of input data. The type of measured quality data that SL collects is presented below.

A.1 Cancelled departures

The operator in charge of a particular bus line records cancellations. For each cancellation the operator pays a fine. If SL detects that an operator fails to report a cancelled departure and SL the fine charged is significantly higher.

A.2 Quality monitoring

Since 2003 SL procures a consultant firm to monitor a set of quality dimensions by so called “mystery shoppers” who travel in the bus system and record the following dimensions.

- cleanliness of the vehicles,
- presence of litter,
- presence of graffiti,
- cleanliness of bus stops,
- graffiti at bus stops,
- the service attitude of personnel,
- if the bus driver calls out bus stop names

A.3 Passenger complaints

Passengers can complain by telephone or e-mail. The complaints are categorized as follows

- the state of a bus stop or terminal
- the state of the vehicle
- the conduct of personnel
- the quality of traffic in terms of for example cancelled or delayed trips.

A.4 Technical punctuality

For this quality dimension automatic equipment is mounted on the vehicles. This equipment is circulated systematically among vehicles and different lines during a year. The equipment

registers deviations in arrival and departure times compared to schedule as well as if the bus arrives at the terminal stop before departure time, as it should.

A.5 Interviews with passengers

A total of 20 000 passenger interviews are conducted during spring and autumn each year. Passengers rate the services in the following dimensions:

- punctuality
- conduct of personnel
- driving performance
- cleanliness of vehicle
- cleanliness of bus stop
- quality of information about delays and cancellations