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Superincentive contracts

A study of the VBP contract models in Stockholm–draft version

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2016

Document Version:
Early version, also known as pre-print

Link to publication

Citation for published version (APA):
Danielson, H., Andersson, H., & Wretstrand, A. (2016). *Superincentive contracts: A study of the VBP contract models in Stockholm–draft version*. (pp. 1). (K2 Working Paper). K2 - Nationellt kunskapscentrum för kollektivtrafik.

Total number of authors:
3

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Superincentive contracts

A study of the VBP contract models in Stockholm – draft version

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Datum: 2016-03-18

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Preface

This is a draft working paper, in its present form submitted to a scientific journal. We await response from reviewers (accept / reject), and how the manuscript could be improved. Any input is therefore welcome.

The basic content was also presented at Thredbo 14, held in Santiago 30 August to 3 September 2015, during Workshop 7 (Market initiative: regulatory design, implementation and performance). Thredbo is the international conference series on competition and ownership in land passenger transport.

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Summary

The Swedish public transport market is characterized by competitive tendering in the form of gross-cost contracts with or without quality incentives. Few contain ridership incentives. Strategic planning of supply and regulatory frameworks on fare levels and fare structures are politically decided, and ticket incomes are kept by the authorities.

Around 50% of the operating costs are covered by ticket income. One exception is the County Council of Greater Stockholm, and some of their new larger bus and tram contracts are based on up to 100% remuneration per transported and verified paying passenger.

It is too early to draw solid conclusions based on a rigorous evaluation of how these new contracting approaches work in practice, but this paper highlights the basic structure of the contracts and problems encountered during the start-up phase and suggests some guidance for further implementation.

The overall assessment of 100% contract remuneration per verified paying passenger as a way of improving services and enhancing cost-efficiency appears to be sound. It is recommended that transport authorities should strive for a homogeneous transport area in market terms, should set standard requirements for quality in combination with penalties, and should choose this contract model only where there is a certain level of stability of demand.

1. Introduction

1.1. Contracting public transport in Sweden

For over 20 years, the majority of local and regional public transport in Sweden has been provided through procurements, and this has led to the so-called Scandinavian contracting model. Today, about 96% of all bus services (except for interregional coaches and commercial holiday tours) are subsidized and regulated by 350 contracts between the 21 regional public transport authorities (with few exceptions) and 92 commercial operators. Over 80% of the volume in terms of vehicle kilometres is contracted out to very large firms such as Transdev, Arriva, Keolis, Netbuss (all foreign operators), and Nobina. The regional authorities handle very different geographies, which means that there are large differences in contract size ranging from one single bus to 336 buses (Transport Analysis, 2015).

It is well established that a free and competitive market may not be optimal for the provision of public transport (see, e.g., Gómez-Lobo, 2007; Nilsson et al., 2014; Parry and Small, 2009). The two classic rationales for regulation and subsidies to promote public transport are scale economies, including the Mohring effect (Mohring, 1972), and to discourage car usage and thereby reducing external costs such as pollution, accidents, and congestion. However, when the market is regulated and the supply of public transport is subsidised by a public authority, contracts need to recognise that the operator and the authority might have different objectives. Contracts should therefore link the objectives of the authority with the detailed workings of the performance incentive mechanism (Gordon et al., 2013), i.e. the triggers that should align the operator objectives with the expected outcome. Hensher et al. (2013) describe four principle types of contracting models:

1. Pure cost-based models associated with cost per bus kilometre and no ridership or service incentives
2. Hybrid models based on forecasts of ridership allocation and residual cost per bus kilometre without incentives
3. Pure cost-based models with ridership and/or service incentives
4. Hybrid models with ridership and/or service incentives.

In Sweden, numbers 1 and 3 are dominating and 41% of the volume of vehicle kilometres consists of gross-cost contracts without any incentives at all, 45% of the volume consists of low incentives (< 25% of payments), and 14% consists of high incentives (≥ 25%) (Transport Analysis, 2015).

According to Hensher et al. (2013), a gross contract "facilitates the integration of fares because it removes the need to allocate the revenue between operators and modes" (p. 233). On the other hand, operators might have a greater incentive for ridership growth if the contract is net based because in keeping the fare revenue they gain from each additional passenger generated. In Sweden, only a few pure net cost contracts have been signed, but a few of the recent contracts in Sweden have 100% incentive payments with some similarities to the simplified performance-linked payment (SPLP) model as proposed by Hensher el al. (2013). As stated by Transport Analysis, the Swedish governmental agency for transport analysis and statistics, this kind of 'super-incentive contract' (Stanley and van de Velde, 2008) is new to Sweden and therefore little is known about its effects (Transport Analysis, 2015). The governmental agency therefore recommends that the public transport authorities work closely with the transport industry in order to develop the design and monitoring of contracts, since there is a need for enhanced knowledge about how different incentives function and in which ways they support or hinder the overall strategic goals of local and regional public transport authorities.

1.2. Regulatory changes

What Didier van de Velde (2014) refers to as a 'watered down' version of deregulation was implemented in Sweden in 2012. The new Swedish regulatory regime is not yet mature, and transport

authorities have yet to find their new role, thus the effects of the 'regulated deregulation' regime (van de Velde and Wallis, 2013) have been quite limited (Rye and Wretstrand, 2014). The only route of significance, the 'deregulation flagship' Nacka-Kista commuter line in Stockholm, has already ceased operations (presumably because of no or too low profit margins). Therefore, at this uncertain stage, Transport Analysis recommends that the government clarify its long-term strategies for how to set the stage for the coexistence of subsidized and commercial public transport (Transport Analysis, 2014).

1.3. Aims of the study

Public transport procurement approaches are beginning to change in Sweden along with a few emerging market initiatives. More and more contracts partly contain ridership and quality incentives, but the basis is still remuneration according to vehicle kilometres produced and number of vehicles in operation. One exception is the County Council of Greater Stockholm. It is fair to say that they are taking a large leap towards innovative ways of remuneration and negotiating contracts. In Stockholm, it is the SL division that plans, develops, commissions, and markets public transport within the county. Transport services are run by both private and public transport operators. Some of their new larger bus and tram contracts are based on 100% remuneration per transported and verified paying passenger/customer, and these could be labelled 'super-incentive contracts'. In theory, the Stockholm approach could be justified because it has been argued that it is far more efficient to remunerate the passenger-related service than the technology-related production of vehicle kilometres or hours (Sonesson, 2006). By establishing this seemingly customer-oriented incentive, the objective is to create innovation and 'market thinking' and to enhance efficiency among bidding operators.

The aim of this paper is to take a case-study approach to address some early observations of these novel ways of contracting in the Swedish context. Furthermore, we intend to raise some crucial questions on how these contractual arrangements function at least in the short term:

- Does the new business model seem sound and sustainable?
- Do the new contracts fulfil the stated objectives?
- How do they affect the authority and the operators?
- What kinds of market impacts could be expected?

The paper is organised as follows. First a background description and the business model objectives are presented. This is followed by a description of contracts and procurements in the Swedish context. Next we present a description of the analysis method, the results and discussion, and some concluding remarks. It should also be noted that we henceforth refer the traditional gross contract types 1 and 3 as 'production contracts'.

2. The Stockholm case: new contracting arrangements

2.1. Background

SL introduced a new business model in procurement process E19B (SLL 2014) that sought to provide bus transport in Norrtälje. This model was subsequently used in the procurement of most new transport contracts. The business model means that all or a large proportion of remuneration to the contractor is based on the number of validated passengers travelling. It goes under the name of a VBP contract (Verifierade Betalande Påstigande = verified paying passengers). The contracts concluded or procured in accordance with the VBP model are shown in Table 1.

Table 1: Current VBP contracts in Stockholm

Contract	Area	Type	Model	Status
E19B	Norrtälje	Bus	50% VBP*	start June 2011
E20	Norrort	Bus, tram	100% VBP	start Aug. 2012 / Jan. 2013
E21	Inner city / Lidingö	Tram	25% VBP	start December 2014
E22	Inner city / Lidingö	Bus	50% VBP	start August 2014
E23	Handen, Tyresö and Nynäshamn	Bus	100% VBP	start 2015
E27/28	Södertälje and Järfälla	Bus	50% VBP	start 2016

* on two BRT routes

2.2. Business model objectives

2.2.1. Perceived defects in the production model

In what was previously the most common business model, SL largely took care of both general and detailed planning of transport services and transport standards while the contractor was involved in the final design of the timetables. The contractor was remunerated based on the number of buses in service and the number of kilometres and hours produced. Incentives and penalties, for the most part large ones, were in place to motivate the contractor to maintain the agreed level of service.

According to SL, the contractor generally tends to try to maintain the minimum required level of quality and to achieve as much production as possible in order to optimise its profit. Production contracts often see the contractor making a financial profit by scheduling more supplementary buses. SL might take care of transport planning under these contracts, but the need for supplementary services can be difficult to confirm. Under production contracts, the contractor has nothing or little to gain from an increase in passengers. In some cases passengers can even ‘be a burden’. In line with several research findings [REF], this contract model is not considered to create a commitment to financial efficiency or for increased passenger numbers.

It should be emphasized that quality and performance incentives have been built into the previous contracts. For example, having satisfied customers is rewarded in production contracts and there are incentives to achieve higher customer satisfaction and penalties if customer satisfaction is below an agreed minimum level.

2.2.2. Objectives of a new business model

SL has defined three main objectives for the development of future transport services, and the intention is that VBP contracts will be able to achieve the objectives of financial efficiency, increased

ridership, and customer satisfaction. Financial efficiency means that the right transport services based on travel demand must be produced at the lowest possible cost. VBP remuneration is not expected to automatically result in higher customer satisfaction and increased ridership, and incentives and penalties remain in place for these.

2.3. Contract structure

2.3.1. Allocation of responsibility

In SL's new business model, the authority defines public transport goals in the tender documentation and assumes responsibility for general transport planning. Put simply, SL defines the minimum standard and which kind of transport services must be used. SL also defines the fares, sets the environmental standards for vehicles, and takes care of general marketing. SL retains all ticket revenues, thus VBP contracts are different from so-called net-cost contracts or service concessions.

The contractor takes care of more detailed transport planning such as routing and timetables. The contractor also decides what kinds and what sizes of vehicles are to be used to meet the contract requirements. The contractor is also responsible for local marketing. However, this marketing must make it clear that it is on behalf of SL transport services. Finally, SL performs quality control to ensure that transport services are meeting defined requirements and must approve the contractor's proposals for transport planning and marketing.

2.3.2. Remuneration model

The contractor receives all or part of its remuneration per VBP. VBP remuneration can, if it does not cover 100% of costs, be combined with fixed remuneration or production-based remuneration. The VBP model can be combined with other incentives, e.g. for vehicles with less environmental impact. The contractor must pay penalties if the agreed standard is not achieved, for example, if there are too many standing passengers or grades that are too low in customer surveys.

2.3.3. Contract size and contract period

The SL contracts are often very large. A bus contract can cover transport services using over 300 buses and generate turnovers of over 600 million SEK per annum. Contracts usually run for eight years, with an option to extend for four additional years. With some exceptions, this option is mutual.

2.3.4. Unforeseen events/termination

The general principle is that larger known events during the contract period are included in the agreed remuneration. This means that the authority must describe these in the tender documentation, and the contractor must take these into account during the tender phase. Normal changes in public transport services in general and in the tender area are also included in the agreed remuneration. If unforeseen events or changes significant for the contract occur during the contract period, each party has the opportunity to convene negotiations about a change in remuneration. The contract text for City Centre Tram and Lidingö Line mentions, for example, changes in laws, changes in vehicles, and changes in possible inspection rates.

2.4. The procurement process

2.4.1. Tender structure

The tender documentation comprises procurement rules, tender forms, and service contracts with appendices. These are negotiated procurement processes in which tenderers have the opportunity to submit proposals that might result in certain amendments to the contract text. Tenderers must submit

not only prices, but also suggested transport service structures, vehicles, environmental impacts, passenger forecasts, forecasts for VBP rate, expected customer satisfaction, etc. Hence, tenderers must carry out wide-ranging, time-consuming preparation and negotiation work on their tenders. The normal tender time is usually not sufficient for completing such proposals, and this leads to higher transaction costs.

2.4.2. Evaluation

When evaluating the tenders, the authority assesses whether the tenders meet legal requirements and the defined requirements, as well as whether they are realistic. The latter is significant in this kind of tender because unrealistic passenger forecasts and validation rate forecasts have a very significant impact on remuneration to the contractor. The tender is submitted as a price for transport services in the first year, after which these are divided by a number of journeys specified in the tender. The number of journeys is based on measurements from the automatic passenger counting system (these data are provided by the contracting authority). It is fair to say that the evaluation process of these VBP 'super-incentives' is much more comprehensive and unusual compared with procurement processes at other Swedish transport authorities.

The tender documentation is comprehensive. It includes not only the procurement regulations, but also the contract including a large number of appendices. The minimum requirements for the transport services, miscellaneous passenger statistics, VBP validation rates, and customer satisfaction data are also included. There is also a forecast for the passenger trend during the contract period, which might be considered to constitute the authority's objectives (SLL, 2014).

3. Method

This section describes very briefly the principles behind the analyses of SL's so-called VBP contracts. The simulation model was made in Excel and consists of

- travel demand data forecasts per day and per hour
- cost of operations and supplies needed over the contract periods

The model is iterative, and a list of model parameters is appended (Appendix 1). The result is the VBP price that a contractor has to submit in order to get the expected return on investment. Incomes and costs are calculated for each year during the whole contract period

The model can calculate outputs for one or more routes. In the case of multiple routes, the end result will be an average value. The model can also combine different proportions of production-based vs. VBP-based remuneration. The advantage with the model is that it easily allows for several demand scenarios to be tested. This is crucial information for assessing the risk that is inherent in a tendered VBP price.

The results section begins with a presentation of six scenarios with respective resulting VBP prices. The independent variables that are used for the analysis are

- Changed level of verification (operators are assumed to try to increase level of verification, i.e. to get passengers to pay)
- Population forecast
- Modal split (market share of motorized transport)
- Peak and off-peak ridership

Ticket price is assumed to remain unchanged throughout the contracting period. Fare levels and structure cannot be decided by the operator.

4. Results and discussion

Below, the results are presented and discussed. First, the tentative expected results are described through the use of case scenarios, because it is too early to be able to conduct a more solid evaluation of the contract impacts. After this, some early observations made by the authority (SL) and the authors are described.

4.1. Case study

Table 2: Selected scenarios – six cases – and resulting VBP price levels

Input variables	**Independent variables - annual increase or decrease**					
	Case 1	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**
Validated trips of total number	1,0 %	0,0 %	1,0 %	1,0 %	1,0 %	1,0 %
Population growth	2,5 %	0,0 %	2,5 %	2,5 %	2,5 %	2,5 %
Market share	0,0 %	0,0 %	0,0 %	2,0 %	2,0 %	-2,0 %
Share of trips in peak hour	2,0 %	0,0 %	0,0 %	2,0 %	0,0 %	0,0 %
Output variables	**Results**					
	Case 1	**Case 2**	**Case 3**	**Case 4**	**Case 5**	**Case 6**
VBP Price	15,29	14,90	14,74	14,58	14,26	13,85
Δ VBP Price	2,6%	0,0%	-1,1%	-2,2%	-4,4%	-7,1%

During the first year in the contract period, the share of validated trips is 85 % of the total number (current level in gross cost contracts). In all cases (except Case 2, the 'do-nothing-scenario') it is assumed to increase with one percentage unit annually until it reaches 90 %. The population will increase annually 2.5 %. The PT market share of motorized trips in the route area is estimated to 23 %. In Case 4 and 5 it is set to increase with 2 % annually, but to decrease with the same amount in Case 6. The share of trips in peak hours is estimated to 9 % from the outset. For Case 1 and 4 it is assumed to increase annually with 2 %, and else remain unchanged.

Case 2 equals the bidder's price in a gross cost contract. The other VBP prices illustrate the sensitivities to factors affecting ridership. The most expensive case above seems to be a combination of peak hour increase and other demand increasing factors. The best case for an operator is in this example case 6, where little pressure is on peak hour resources.

Increased ridership requires eventually more vehicles. However, if the contract allows for the operator to use 'cheaper material' in certain peak periods, this will affect the VBP price. If the additional bus needed is an old one, the resulting cost per trip then decrease from 14.26 sek/trip to 13.85 sek/trip. This shows that whether or not the operator has certain degrees of freedom with respect to fleet mean and max age is very important in a VBP contract.

These results demonstrate that it is quite difficult for an operator to calculate the costs and price per trip in a VBP contract. There are a lot of different factors that affect the operating costs, and we have only selected a few in our cases.

As seen in Table 3 below, the variables have different impacts on the costs. It is always profitable for the contractor to increase the share of validated trips. This is possible to do achieve without increasing production. An increase in population (potential demand) and market share can be either profitable or not; it depends on the size and timing of the increase. The worst case for a contractor would be a relatively larger increase of peak hour demand.

Table 3: Unit changes, independent variables and resulting VBP response

Variable	Δ x	Δ VBP	Comments
Share of validated trips	1 %	-1,0 %	VBP price decreases stable when validation increases
	2 %	-2,0 %	
	3 %	-3,0 %	
Population growth	1 %	-6,0 %	No need for increased production
	2 %	1,4 %	Increased production
	3 %	1,3 %	
Market share	1 %	-3,2 %	No need for increased production
	2 %	-1,0 %	Increased production towards the end of the contract period
	3 %	1,4 %	Increased production early in the contract period
Share of trips in peak hour	1 %	0,0 %	No need for increased peak hour production
	2 %	5,7 %	Need for increased peak hour production, later on
	3 %	11,9 %	Need for increased peak hour production, early on

* A negative change in VBP price renders a profit increase – or a possibility for the contractor to submit lower bids

Again, with the examples in Table 3, it shows that VBP bidding is associated with uncontrollable risks. Dependable forecasts are necessary. Correspondingly, it is of course also difficult to evaluate bids and the forecasts and scenarios they be based on.

4.2. Expected outcomes

4.2.1. Fulfilment of objectives

Because more VBPs represent increased remuneration for the contractor, the contract model should result in proactive work by the contractor to increase the number of validated passengers. The contractor benefits from checking that all passengers have a valid ticket and it benefits from the number of journeys increasing. These are probably the easiest tasks, and the results should be seen at a relatively early stage of the contract period.

The remuneration does not increase if transport production increases, for example, if supplementary services need to be added. Remuneration is only linked to ridership. The fact that transport production is correctly adapted to demand should increase both the number of trips and the financial efficiency of the operation. Tenderers propose the structure of transport services in their proposals. Some suggestions can be implemented when services start, while others require measurements to be made within the infrastructure of the tender area after operations have been running for some time (by the city – another important stakeholder for reaching the objectives).

It is, however, not certain whether the contract model results in increased customer satisfaction. More focus on customer satisfaction, enhanced punctuality, etc., tends to increase customer satisfaction scores, while increased congestion can lower the satisfaction scores [REF]. It is still assumed that the contract model will result in a more engaged and market-oriented contractor, which in turn should be positive for the development of better public transport services.

4.2.2. Passenger growth

The public transport industry in Sweden has the objective of doubling the number of journeys on public transport and doubling the market share of motorized transport. The Stockholm region is experiencing strong population growth, and a conscious policy is also being pursued to reduce the number of car journeys, supported by a congestion charging system in the inner city region (Börjesson et al., 2012). It is worth noting that the contractor is not responsible for the number of journeys increasing because of this 'external policy', and a dramatic increase in road-use charges might result in a significant modal shift [REF].

Another issue of importance is the valid passenger data. In gross cost contracts, there are seldom incentives for increased validation rates, and passenger base line data from the ticketing system are underestimating the actual patronage. Therefore, the easiest way for the VBP contractor to increase its income should be to increase the validation rate. This increases ticket revenues for SL, because the fare box is kept by the authority, but remuneration to the contractor increases even more.

It is obvious that the number of passengers depends on population changes in the city region. One interesting question is therefore whether the contract model can be used in areas where the population is declining.

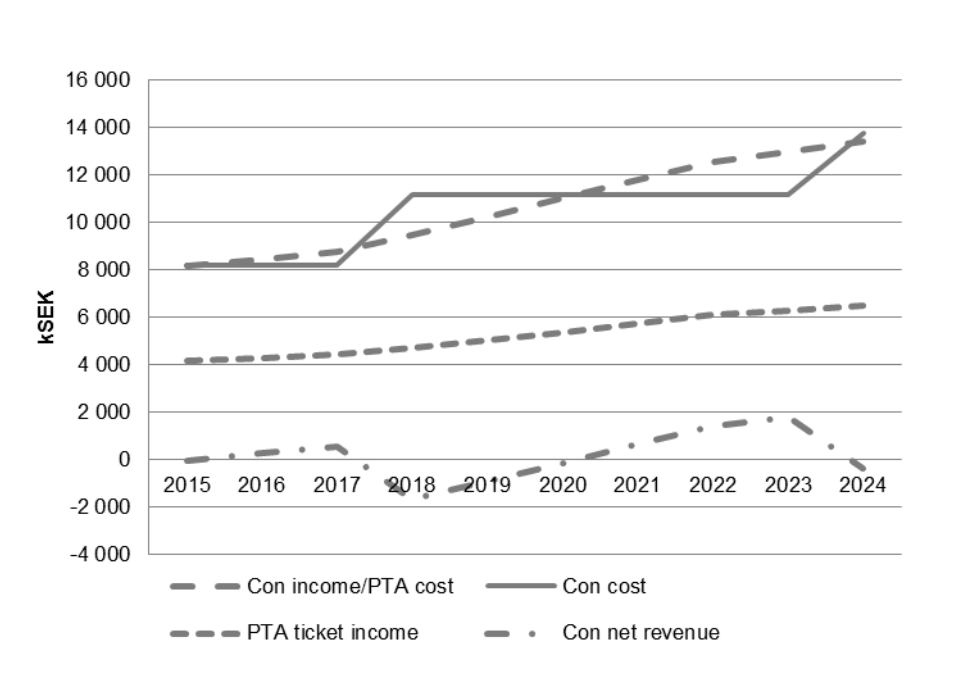

Figure 1: Costs and incomes, data from the Case 2 scenario

The dashed curve (Con income/PTA cost) in Figure 1 depicts an example of the authority's cost, which is the same as the contractor's income, when the number of journeys increases. The solid curve (Con cost) shows the contractor's cost trend, depicting the characteristics of scale. The costs increase dramatically when transport services need to be increased because of increased capacity requirements. The fact that the contractor takes a loss at the first half of the contract period is characteristic of VBP contracts with an expected increase in the number of journeys. The profit comes at the end of the contract period.

Every increase in production instantly reduces the contractor's profit. The most profitable solution for the contractor is to increase the number of journeys during off-peak service times and to plan routes so that there is equal loading in both directions (this is probably a well-known fact for the authorities but not so clear for new VBP tenderers). Routes with a high proportion of short journeys require low VBP remuneration, while express bus routes with long journeys require high remuneration. This needs to be

kept in mind in large contracts that contain several kinds of routes and in which the VBP remuneration under the contract is an average value.

4.2.3. The authority

In its business model of tendering the services, the authority must concentrate its resources on the long-term trend in transport services, and it must define objectives and minimum standards for transport services. The authority must also ensure that there is compliance with the terms and conditions of the contract. One advantage of this model is that long-term planning, which has long been a neglected strategic activity but is emphasised in the new Swedish regulatory framework (Rye and Wretstrand, 2014; Transport Analysis, 2014), should gain more attention within the authority's organisation. Short-term planning has hitherto assumed too much importance in relation to long-term planning.

An advantage of introducing the new VBP model is that a contractor who comes from 'the outside' with different ideas and experiences can come up with new suggestions and novel solutions for transport services. This type of contract should, in theory, increase creativity and innovation. However, a possible drawback is that the authority loses influence over short-term planning. A contractor with less local experience can, of course, have both good and bad new ideas. The authority must therefore scrutinize and approve the contractor's transport planning concepts in the contract model.

The authority has the sole right to decide on the fare structure and level. If ridership should increase to the extent that the fiscal budget is in danger, it will probably be regulated through increased ticket prices. If, for example, prices are increased during peak periods, ticket revenues increase and the number of journeys falls. An increase in the number of journeys might well be the objective of the authority, but public finances seldom lose their importance. A significant increase in ticket prices can therefore be a sensitive issue because a reduced number of journeys reduces the contractor's income. In reverse, if the discussion of reducing fares gains further ground (ticket prices in Sweden have increased more than the consumer price index over the past 10 years), this this is likely to jeopardize public finances unless large supply cuts are made in the traditionally contracted operations.

4.2.4. The contractor

In a gross-cost production contract with quality incentives (bonus/malus), the contractor normally does not allocate any resources to transport planning that aims to result in an increased number of journeys. The contractor concentrates on cost reduction (production planning and staff planning and training) so that penalties are minimised and incentive remuneration is maximised. It is perhaps more correct to say that the penalties and incentive remuneration are planned in order to optimise the sum of the two. According to SL, one opportunity for profit seems to be for the contractors to increase production [REF]. Supplementary production has special remuneration in the traditional contracts, and this remuneration is often greater than the contractor's increased costs.

In VBP contracts, the contractor can be expected to allocate resources for route and timetable planning with a dedicated focus on satisfying demand for travel. The contractor should also be more interested in transport and land-use planning in general, especially in the planning of new business and residential areas in the contract area. The opportunity for direct routes, good accessibility, etc., is important. Collaboration with the municipalities should be encouraged and supported by the public transport authority, and local engagement is important in a big city region like Stockholm. Of course, the success depends on how the contractor develops and organises its future (new) planning activities.

It is also profitable to attempt to spread the traffic peaks. The contractor, however, cannot influence ticket prices and fare structures, which is the most important tool for demand management. The increased costs as an obstacle for deploying more vehicles in peak periods can result in increased

congestion, and it is important that the authority defines key performance indicators for seating capacity standards and customer satisfaction scores in order to counteract this.

One of the drivers behind the increasing public transport costs in Sweden has been the increasing demand for route density, low emission vehicles and new technologies, and safety requirements (Holmgren, 2013). It is important to stress that in a VBP contract, the operator does not benefit from deploying vehicles with less environmental impact or by investing in costly new technologies. Here too, minimum standards and penalties or incentives are required if the authority wants the contractor to implement environmental technology improvements throughout the contract period.

4.3. Measured outcomes

The following texts are summaries of SL's internal evaluation and experiences gained so far with VBP contracts.

4.3.1. E19B

Two main routes are provided with 100% VBP remuneration, and other regional and local routes are provided under gross cost production contracts. Passengers on buses in Norrtälje have become more satisfied during the contract period. The contractor of E19B, from now C19B, is managing transport services well and is working actively to improve quality and has succeeded in many areas. All KPIs, except punctuality, have scored better since services started under the new contract.

The KPI 'Satisfied customer' is exceeding the transport administration's target [REF]. However, passengers' experiences of punctuality and information about delays are not entirely satisfactory even though they have improved in recent years. If customers are to be even more satisfied, punctuality and information about delays should be given priority in the future.

C19B seems to be working continuously on product development in order to improve the quality of its operations. Among other things, C19B has centralised transport management and introduced market concepts like the 'Green Journey', which is intended to make bus travel safer and also more environmentally friendly. C19B has undertaken quality development and improvement work continuously over the years in order to improve quality levels during the contract period.

4.3.2. E20

The Bromma, Solna/Sundbyberg, Sollentuna, and Norrort contract is entirely in the form of VBP remuneration (100% VBP). After a very challenging start-up phase, which was plagued by a number of challenges in many areas, transport services in the E20 areas operated by contractor C20, i.e. the contractor of E20, have reached an acceptable standard, although there is still work to be done. The objectives defined to encourage C20 to strive to attract more passengers, and more satisfied passengers, are very ambitious. Some other KPIs are also set significantly above average demands [REF].

For E20 bus services, the demand trends have differed across the various transport areas. Travel has increased in Bromma and Solna/Sundbyberg, it has decreased in Sollentuna, and it has increased slightly compared with the previous year in Norrort. The assessment is that it is still far too early to assess whether the E20 contracts are contributing to achieving the overall strategic goals defined in SL's policies.

4.3.3. Comments

The start of transport services in the E19B contract seemingly went relatively well. One problem, however, was that SL's ticketing machines did not work properly. Thus, a supplementary contract had to be drawn up to the effect that transport services were provided with gross-cost production

remuneration for the initial period. It should also be mentioned that the E19B contract covers a relatively small area of operation compared to other SL contracts.

Addressing the more challengingE20 contract, the start of the contracted services was chaotic. There were numerous cancelled departures, and punctuality was poor. The operator also failed to allocate transport resources in a proper and balanced manner. Far too many resources were deployed in certain areas where they were not needed, and vice versa. It should be emphasised that the E20 contract covers a very large transport area and that the contracted transport services started in two stages.

4.4. Market impacts

It is difficult to assess the size of the tenderers' profits and risk margins. An assessment has been performed with the aid of shadow calculations and a comparison with existing contract prices (SLL internal audit). The results of this assessment show that the winning bid price of the E20 contract was lower than expected, and the winning tender was significantly lower than that of the other two competing tenders. It is not possible to say whether the price would have been even lower if there had been a production contract with incentives. However, the contractor was obviously willing to take on the risk of VBP remuneration.

The E20 contract was followed by a more conservative design in contracts E21 and E22. The profit and risk margin seemed to be normal in the E21 contract for the Lidingö Line and City Centre Tram. Surprisingly, there were only two tenders submitted in the procurement process. Coming back to a more advanced approach, with 100% VBP, the profit and risk margins were actually normal in the procurement process for the E23 contract – the Handen, Tyresö, and Nynäshamn bus transport services – when compared with the expected price. Here, too, the number of tenders was only two.

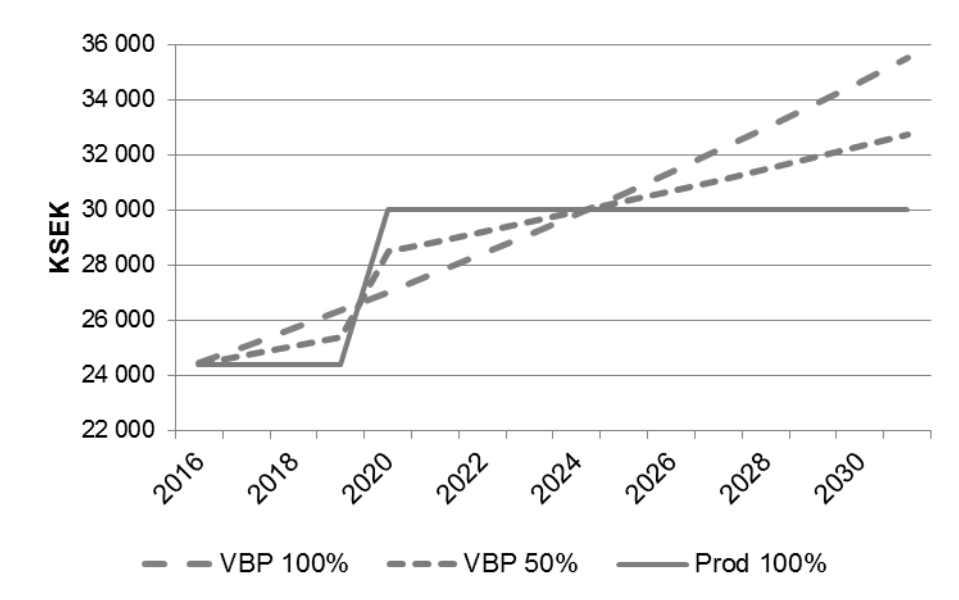

Figure 2: Incomes with different use of VBP-incentives

One reaction from the operators' side has been that going from 100% to 50% VBP remuneration would reduce the commercial risk. Nevertheless, Figure 2 indicates in fact that the VBP 100% system has a better return and almost double the net present value if the initial burdens are taken into account, yet at increased market risk.

Experiences gained to date are that the major danger does not seem to be that the profit and risk margin – and thereby the cost for the PTA – increases. Instead, it is more salient that the number of tenderers is small. This does not necessarily depend on VBP remuneration, and it could also be due to the fact that SL's contract areas are very large, which in turn requires tenderers to have significant

financial resources. This, together with the previously mentioned drawback to the VBP model – that the contractor will probably incur a loss during the first part of the contract period – will require (international) companies with strong and patient ownership structures.

We have not yet considered contract length. However, it could be assumed that the VBP contracts lend themselves to longer contract periods. Weeneman et al. (2014) have found that a longer duration of the contract is associated with greater cost efficiency of the concession contract. The transition costs of tendering were also generally high for these contracts, which indicates that VBP contracts – because they need much more preparation work for both the authorities and the operator – should also be extended in time compared to standard gross-cost contracts.

Vigren (2014) also found that payments were increasing more slowly over time meaning that longer contracting periods tended to yield lower costs. However, as Vigren states, it is important to note that extremely long contracts could have disadvantages such as lock-in effects and the inability to adjust the system to demand changes. There is obviously a trade-off between costs, risks, and flexibility.

5. Conclusions

The concepts of 'super-incentive contracts', suppletive remuneration, and, as described in this paper, remunerating contractors in full according to the number of VBPs are relatively new in Sweden. It is therefore not yet possible to assess the long-term consequences of these contracts. In the short term however, it does not appear that the transport authorities' costs have increased. Experiences of the start-up periods of the contracts have been mixed, but this has not necessarily been because of the method of remuneration, but rather due to some of the contractors' lack of experience in transport services in the contract area or the Stockholm region.

Based on the experiences gained so far, our overall assessment of VBP remuneration as a way of improving services and enhancing cost-efficiency is that the basic concept of VBP remuneration appears sound. We recommend that the following issues be considered when designing such contracts, particularly with reference to the demonstrated sensitivity of the VBP price to external factors beyond the operator's influence:

- Define and decide on well-considered, realistic goals by linking strategic governance with tactics and operations
- Strive for a homogeneous transport area in market terms
- Set standard requirements (KPIs) for quality, supply, technology, environment, and customer satisfaction
- Use penalties to secure minimum levels of performance
- Select the VBP model only where there is a certain level of stability in the market
- Add varying levels of production remuneration if there is major uncertainty about the future
- Consider whether VBP remuneration should be the same for all routes
- Procure VBP remuneration directly without any detour via a production-based tender price

Concerning the issues of further research actions, in line with van de Velde and Augustin (2014) we suggest that research should focus on the development of relationships between the entrepreneurial stance of the operators and the behaviour of the transport authorities in light of the 'new rules of the contracting game'. Some questions to be dealt with might be:

- How do the experiences gained from contracts with super incentives affect the design of new contracts and the market?
- Will other regions follow the Stockholm example with super incentives and elaborated negotiation in the tendering process?
- Will there be a swing back to production-based remuneration, or will there be a shift towards net-cost contracts?
- How well do these super-incentive contracts support other policy goals and more integrated sustainable urban mobility planning (e.g. shared systems and e-mobility)?

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Appendix

Table A1: List of production cost model variables, assumptions and examples of output data

Input variables	Case 1	Output	Case 1
Estimated production cost year 1 (MSEK)	8 250	SEK per VBP	15,02
Number of trips ATR[1] (millions per year)	650 000	SEK / VBP - off-peak price	15,03
Possible VBP registrations (%)	0,9	SEK / VBP - peak price	15,03
VBP-registrations 2012 (%)	0,75	SEK / VBP ext. on over forecast	0,00
Population - base year (number and year)	3 500	Offer price production	8 780
Population - forecast (number and year)	4 500	Present value Interest	5,0 %
Number of routes	1	Performance agreement million	78,70
Routes in peak hour, one direction	4	Results including option years M	578,10
Day equivalents (days per year)	320	Results first year M.	246,60
Trips in peak hour morning (%)	9,1 %	Production cost	14,60
Trips in maximum direction (%)	77 %		
Variation between trips in peak hour	1,5		
Motorized journeys per inhabitant and day	2,5		
First year	2015		
Contract period – nr. of years	8		
Option period - nr. of years	2		
Share of production-based remuneration	0 %		
Calculations			
Trips per day - base year	8 750		
Trips per day - forecast	11 250		
PT – trips per day in base year	2 031		
PT share of motorized travels - base year	23,21 %		
Frequency – Interval in minutes	15,0		
Peak hour – trips per departure / direction - base year	30		
Population growth per year *for the period above*	2,86 %		
Assumptions			
Population increase - per year	2,50 %		
VBP share from ATR - first year	85 %		
VBP increase per year	1,00 %		
VBP maximum share of ATR	90 %		
Market share increase - per year	0,00 %		
Maximum market share (%)	35 %		
Trips in peak hour - change per year	0,0 %		
Trips in maximum direction - change per year	0,0 %		
Profit and risk margin	0,0 %		
Present value Interest	5,0 %		

[1] ATR Automatic Travel Counts

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