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2016

document version

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citation for published version (APA)

Mouwen, A. M. T. (2016). *The Impact of Public Transport Reform: an Assessment of Deregulation Policies*. [PhD-Thesis - Research and graduation internal, Vrije Universiteit Amsterdam]. Vrije Universiteit.

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7.1 Summary

The importance of public transport (PT) in sustaining a healthy and accessible environment is increasingly recognized. Especially in cities, PT can contribute to solving congestion and reducing CO₂ and other pollutants. However, PT services in general are only viable with the aid of large amounts of public subsidies. This PhD thesis is mainly focused on assessing the effects of introduction of a competitive regulatory regime that was introduced in Netherlands as of the year 2001 on urban and regional PT. This policy change may be essential in achieving efficiency and equity objectives. The approach is based on theoretical and empirical analyses of the economic structure and of the institutional context of PT before and after introduction of competitive tendering (CT). The aim of this study is to clarify the complex mechanisms underlying PT provision, demand and finance in a (de)regulated environment dominated by CT, and to assess the impact of CT on passengers, PT authorities, and PT firms.

In Chapter 2 the costs and production characteristics of the public transport (PT) industry, arguments for the regulation of PT and competitive tendering (CT) are introduced. Essentially, government organizations impose regulatory policy as a mechanism to minimize economic inefficiency and to make welfare distribution more equitable.¹¹² Why regulate the PT industry? General theory puts forward three main fields of argument for regulation: economic, social and political. The most used economic arguments (the efficiency principle) are that PT holds characteristics of public goods and natural monopolies. However, these claims have also attracted criticism. Social arguments (the equity principle) for regulation refer to PT being essential for individuals' basic welfare, and a non-discriminating service supply has to be assured by regulation to protect the weak and the poor in society and to strengthen social cohesion, safety and public health. Apart from these theoretical arguments, in practice the prime political determinants for imposing regulation on the PT sector are general budget deficits. Section 2.1 demonstrates that public transport services are network services and are tied to public welfare. In regulating PT services, two potential dangers lie in wait. The first danger is under-regulation and market failure due to natural monopoly features and the irreversibility of investments. The second danger is service meritorization (regulatory failure) as PT has characteristics of a public good. Therefore, the classic first-best solution (self-regulation by means of competition within the market) cannot simply be transposed onto these services and the second-best solution may be optimal. The proponents of regulation and of deregulation agree that, under the condition that the network remains a (natural) monopoly, separating the network and the services over the network may be a feasible second-best solution. There is also agreement on the argument that, if public control is deemed necessary to control a market, when properly used, competitive tendering (CT) may be an instrument by which control can be carried out with the minimum loss of efficiency. A number of authors argue that the transaction cost

112 We define 'regulation' as a situation in which a public entity imposes restrictions on one or several key decision parameters for PT firms.

of tendering should be accounted for when assessing the effects of competitive tendering. Transaction costs have a bearing, for instance, on the costs incurred by the invitation to tender, pre-selection of suppliers, drafting procedures and award criteria, preparing bid documents, processing the bid competition and monitoring performance.¹¹³

Chapter 3 serves as an introduction to PT in the Netherlands. The chapter describes the way in which CT in the Netherlands is implemented and provides quantitative information on the demand, supply, governance and transaction cost of competitive tendering (CT). In the Netherlands, as in many European countries, CT became popular in a period of economic crisis and rising general budget deficits in the mid-1970s and 1980s. This regulatory instrument was deemed potentially able to reduce costs and subsidies. Discussions on the new governance arrangements for the PT industry in the Netherlands resulted in legislation that became effective in 2000. This legislation provided for phased CT introduction. Importantly, regional authorities have the freedom to retain the responsibility for decisions at the tactical level (the planning function) at their own discretion or to position them with the operator. This is a crucial decision in market performance terms and functioning as it defines whether the PTA or the operator is in control of designing the route network, fare level and level of service. Although the aim of the central government is to position this planning function with the operators, the practice is that nearly all PTAs keep tight control, resulting in a situation in which the primary decisions concerning PT planning are made by politicians. Section 3.2 discusses the mobility market in the Netherlands since 2000 and shows the relatively small share of bus, tram and metro (BTM) use: on average about 3% and in heavily urbanized areas 6%. The BTM supply (number of vehicle kilometres) has increased steadily over time, which may be linked to the introduction of competitive tendering. As the demand does not keep pace with the supply, the occupancy rate of BTM declined after 2006. After 2002 the growth in the fare box revenues exceeded the growth in the total operational expenditures, implying that the cost recovery ratio improved. The descriptive statistics on CT show a sharp decrease in the number of incumbent firms that stay in charge after competitive bidding (83% in 2002; 33% in 2014), indicating that the market is maturing and the comparative first-mover advantage is diminishing. Over time, the contract duration has increased considerably. The average number of bids per procedure has remained more or less the same (around three); however, in more than 80% of the procedures only the three big contenders (Arriva, Veolia and Connexxion) placed a bid and took a share of the market. Public governance became more concentrated after 2000 (fewer concession areas and fewer authorities). In Section 3.4 the level of transaction costs (TC) is estimated. Data on individual contractual arrangements and on transaction costs are not publically available. We assessed these costs based on a selected sample of respondents. Although this information could not be validated, it provides us with valuable estimates of the level of transaction costs of both parties involved (PTAs and operators). For the period 2001–2015 the average annual ex

113 In Section 3.4 transaction costs of PT services' procurement by way of competitive tendering are estimated.

ante transaction costs of competitive tendering amounted to 14.4 million euros to 35.5 million euros.¹¹⁴ In small concessions the transaction costs may account for 17% to 40% of the subsidy savings of first-time contract renewal initiated by competitive tendering.¹¹⁵ As the contract volumes increase, the relative share of transaction costs decreases, but in large concessions (with an average annual subsidy of €54.3 million) the share still amounts to 4% to 10%.¹¹⁶ We assess the potential problems generally associated with CT in the Netherlands. The PT services to be procured are complex in nature, and so are the contracts. Due to this complexity there are indicators for opportunistic bidding and operator-led contract renegotiation. Ownership of the infrastructure and other assets is often mentioned as a potential problem for CT. For the Netherlands, however according to our informants, this is probably less of an issue as the ownership of the most strategic PT infrastructure (terminals, stations, shelters and traffic and information systems) is in public hands. The award procedures leave room for subjectivity and ambiguity, as authorities use a mix of qualitative and quantitative criteria to assess the bids. Problems associated with award criteria and procedures are the main reason for legal disputes. Our respondents believe that the substantial bidding costs (see Table 3.7) are the main trigger for these lawsuits. Bidding imparity is not much of a problem as PTAs provide as much as possible a level playing field,. Finally, there is no evidence of colluding bidders.

In Chapter 4 the focus is shifted to the customers, that is, the users of public transport. In this chapter the drivers of customer satisfaction with PT are studied. Information on these drivers is relevant to PTAs aiming to enhance customers' orientation of operators. Based on the literature a theoretical model using satisfaction concepts is constructed first. Customers' assessments of a service depend on the balance between sacrifices and benefits, both monetary and non-monetary. Moreover, passengers' perceptions of the different service aspects are heterogeneous. In this thesis a distinction is therefore made between customers' satisfaction with respect to specific transactions or service encounters and customers' global or overall evaluation of a service. Transaction-specific satisfaction (TSS) is the result of a cognitive judgement of transactional service encounters. In contrast, overall satisfaction is a more holistic construct and is an affective/emotional response to a perceived discrepancy between expectations and perceptions after a service delivery experience. The relationships between attribute-based satisfaction, overall satisfaction and customer characteristics are modelled by means of linear models. Overall (OS) and transaction-specific satisfaction (TSS) are modelled as a function of customer characteristics. Accounting for customer characteristics, OS as a function of TSS is also modelled, thus deriving importance scores (or weights) of the service attributes for several customer groups. The models are controlled for interaction between TSS and customer characteristics. A number of hypotheses are tested using data on the

114 The 2015 price level.

115 The costs and subsidy savings due to contract renewal under a CT regime are estimated in Chapter 6.

116 We expect the transaction costs of CT to increase in the future as the trend in the Netherlands is towards longer-term, higher-volume contracts.

satisfaction scores of urban and regional Netherlands PT users (bus, tram, metro and regional train) for the years 2010 and 2011 (N = 90.000 annually). The average level of overall satisfaction is 7.28. Positive outliers are satisfaction with the attributes *seating capacity*, *ease of boarding and alighting* and *safety on board*. Negative outliers are satisfaction with the *on-board information on delays* and the *prices of the tickets*. The results show that the attributes *travel speed*, *on-time performance* and *service frequency* (core attributes) are the most important determinants of overall satisfaction. It is also noteworthy that the interactional attributes *personnel behaviour* and *driver's behaviour* and the physical attribute *vehicle tidiness* are considered to be very important. Furthermore, interaction models with respect to the customer segmentation variables age, mode choice, experience with negative social safety experiences (NSSEs) and urban density are estimated. The results demonstrate that elderly people attach significantly more weight to service frequency, implying that a policy aimed at increasing the service frequency in general mainly affects the attribute importance of elderly people. As the service frequency is linked to the waiting time, this may be correlated with the declining physical condition of elderly people. The results also show that elderly PT users place more emphasis on the attributes *price*, *on-time performance* and *service frequency*. The PT mode choice significantly affects the satisfaction levels and attribute importance, the latter especially with regard to *on-board information on delays*. Replacing bus lines with metro lines will lead to a radical change in attribute importance, to an increase in satisfaction with *on-board information on delays* and to a decrease in satisfaction with *on-time performance* and *service frequency*. Negative critical incidents may play an important role in service. We show in Table 4.6 that NSSEs in PT in the Netherlands have a significant negative effect on the overall and attribute-level satisfaction. These are remarkable results: passengers who have experienced one or more social safety incident not only rate satisfaction as relatively low for the attributes *safety during the trip* and *safety at stops*, but also are less satisfied with attributes that have no relationship with the incident itself. With regard to the impact of urbanization on satisfaction, Table 4.6 reveals that the level of satisfaction with eight out of eleven significant service attributes is lower in highly urbanized areas than in areas of low urbanization. The relatively low level of satisfaction with the attribute *personnel behaviour* in highly urbanized areas is also striking. It is concluded that, especially in highly urbanized areas, it is probable that increasing the frequency of services and introducing new vehicles will have a major positive effect on the level of satisfaction. Our empirical results do not support the hypothesis that the composition of satisfaction between user groups differs significantly.

The relationship between tendering and efficiency is widely studied. Few studies, however, focus on the relationship between tendering and satisfaction. In Chapter 5, building on the results and insight of Chapter 4, that relationship is explicitly investigated. We test whether the introduction of competitive tendering (CT) in the Netherlands affects passenger satisfaction. The model building and analysis are based on the comparison per year-pair of regions tendered

versus regions non-tendered (in that specific year-pair). Thus, the effects on satisfaction of tendered regions relative to non-tendered regions are compared controlling for area fixed effects. With regard to the effect of CT on overall trip satisfaction the findings demonstrate for the period 2001-2010 that, after controlling for year and area fixed effects, in 58% of the tendered regions the overall satisfaction increased after tendering, whereas in the other 42% the overall satisfaction decreased (compared with non-tendered regions). The net difference in the overall satisfaction for regions with and without CT is only +0.06 points (on a 10-point scale). The results also show that the first round of CT has a more positive effect on satisfaction than the second round of tendering. We show that this is a matter not only of sequence (first versus second), but also of timing (early versus late). The attributes that contribute most to this change in overall trip satisfaction are *vehicle tidiness*, *on-board noise*, *ease of boarding/alighting from the vehicle* and *service frequency*. The attribute values that are linked to *information* and to *on-time performance* in the tendered regions are negative, meaning that the satisfaction with these attributes worsens in comparison with non-tendered regions. The common factor in these attributes is that they all refer to reliability. If the attributes are weighted, these results become more pronounced. It is tempting to assign the above-mentioned outcomes to the implementation of tendering itself, but caution is necessary. In Section 5.8, therefore, the effect of new vehicles and new operators on satisfaction is examined, as these variables are closely related to the introduction of CT. The analysis shows that new vehicles greatly affect the overall satisfaction as well as the satisfaction with many attributes. The greatest impact on satisfaction from the introduction of new vehicles pertains to the satisfaction with the *vehicle tidiness*, *prices of the tickets*, *on-board noise*, *seating capacity*, *information provision on stops* and *travel speed*. It is striking that the introduction of new vehicles affects both vehicle-linked and non-vehicle-linked attributes. It is therefore plausible that new vehicles contribute to a positive general perception of public transport use. It is concluded that the satisfaction difference between tendered and non-tendered areas is mainly caused by new vehicles' introduction. This introduction is accelerated by the process of CT. If, due to CT, a new operator takes over from the incumbent, the overall satisfaction and attribute satisfaction are negatively influenced. Finally the satisfaction with the attribute *on-time performance* seems to take hardly any advantage from CT; it even seems to be negatively related to tendering. Apparently the shift in attention in the tendered regions to the attributes *speed* and *frequency* have had adverse effects on (the satisfaction with) *on-time performance*.

In Chapter 6 the effects of regulatory change on operational costs, subsidies and ridership are estimated. We employ panel data for the period 2001–2013 on the level of concession areas and take the most relevant contract attributes into account. We showed in Chapter 2 that network characteristics exert a strong impact on PT efficiency, and it is therefore essential to control for (exogenous) relevant network characteristics. Most cross-section studies control for variables such as network length, average speed and number of stops and lines; however,

other network characteristics that may influence firms' productivity cannot be assumed away, thereby potentially biasing these analyses. Our approach avoids this issue by using panel data with concession area fixed effects, thereby controlling for all the time-invariant unobserved area circumstances that may influence the production efficiency of the firm. A literature review of the most important factors that affect PT efficiency is performed. We discover four influential determinants: awarding mechanism, contract type, firm ownership and network conditions. Additionally the literature review reveals an ongoing debate on the most appropriate output measure for assessing PT performance. The literature results indicate that CT effectively increases firm efficiency and decreases subsidy transfers. The contract type is seen in many studies as a powerful instrument for PTAs to govern transactions with the operator, as contracts make it possible to introduce specific incentives. The literature review reveals that high-powered incentive contracts (especially gross costs contracts) seem to perform best regarding efficiency. According to economic theory, firm ownership matters because public companies tend to be less efficient than private companies, as their deficits are covered by authorities. The empirical evidence on the efficiency effects of ownership in the PT sector, however, is not conclusive. In PT the network conditions are important. Many studies reach the conclusion that economies of scale and density are relevant; however, the studies present a wide diversity of outcomes. Robust results are that firms in small PT networks produce inefficiently and scale elasticities decrease as production increases. PT output may be measured in terms of supply, such as vehicle hours or vehicle kilometres, or in terms of demand, such as passenger kilometres or passenger trips.¹¹⁷ Supply-oriented measures are most commonly used in empirical efficiency studies, albeit not reflecting the economic motive of PT supply. On the other hand, demand-oriented measures ignore the point that input factors such as fuel and labour do not vary systematically with the demand. In addition the demand for PT can only be influenced by PT operators to a limited degree. Other authors conclude that supply-oriented parameters are preferable. We use both measures in our empirical application. We develop a number of econometric models to assess the efficiency in PT in the Netherlands and are able to apply the models to a panel data set that we collected for this study. Importantly, by including concession area fixed effects, we improve on the existing studies as we are able to control for time-invariant area-related unobserved variables, such as residential density and network length. In Table 6.3 the main results are provided for several specifications of the operational costs model and for a specification using subsidies as the dependent variable. The results of the most basic specification imply that contract renewal leads to a substantial reduction in operational costs. When a contract is renewed at least once, the costs fall by 10%. Contracts that are renewed at least twice even lead to an extra cost reduction of 6%, resulting in a total reduction of 16%. A third contract renewal seems to reduce the operational costs even further,

117 The choice of output measure matters considerably. Berechman and Giuliano (1985) estimate a cost function using a demand-related output measure, as well as a supply measure, and show increasing returns to scale for the former and the opposite for the latter.

but this effect is not statistically significant at conventional significance levels. These results imply that the effect of contract renewal diminishes over time. We do not find evidence that there is an effect of competitive tendering on operational costs, suggesting that the threat of CT is sufficient in a market in which the majority of concessions is competitively tendered. The estimated coefficients of (log) vehicle hours show that considerable economies of density exist within concession areas.¹¹⁸ The cost elasticity of density is about 0.40, meaning that if the production volume on a given network increases by 10%, the costs will increase by 4%. In the case in which the CT procedure leads to a new operator, PTAs are willing to pay 8% more than in the situation in which the incumbent stays in charge. This effect is unlikely to be induced by differences in factor input prices between operators, as all bidders (new and incumbents) have to abide by the legislation and act under the same conditions.¹¹⁹ Our explanation for this finding is that, within the boundaries of a subsidy cap set by the PTAs, new operators perform better on quality criteria than the incumbent, although their costs are higher than those of the incumbent. In Section 6.2 we show that in efficiency studies a supply-oriented measure of PT performance seems to be the most appropriate. Our results indicate a significant positive effect of contract renewal on (log) passenger kilometres. Renewing a contract results in a 7.6% increase in passenger kilometres. As regards the optimal size of concession areas, our results indicate that PT in the Netherlands is produced in a situation of constant economies of scale: the effect of (log) vehicle hours is 1.165 but it is not significantly different from one in which the square of (log) vehicle hours is essentially zero. If any economies exist, slight diseconomies of scale are most probable. This implies that the concessions areas – whether big or small – are the optimal size and the operational costs cannot be reduced by changing the size of the concession area by geographical allotment.

7.2 Conclusions

7.2.1 Conclusions on the research questions

With regard to the research questions that were formulated in Chapter 1, the main conclusions that are drawn can be summarized as follows. On the research questions of block 1, it is concluded that there are solid arguments for public intervention in the PT sector. Most prominent argument is the network feature of PT provision leading to possible market failure. It is also concluded that formal stipulation of arrangements between PTAs and operators in a contract is a powerful instrument in hands of PTAs. Therefore a proper and consistent process

118 The network size remains largely constant in the concession areas (see Table 6.1), so it is more appropriate to interpret this result as economies of density rather than economies of scale.

119 These results indicate that regulatory schemes and operators' efficiency levels are exogenous and that the operators' information level about their technology and their efforts to reduce costs are greatly unobserved by the PTA. Therefore, the theory of regulation under asymmetric information may apply to the PT industry in the Netherlands (see Laffont and Tirole, 1993; Gagnepain and Ivaldi, 2002).

of PT procurement (including a targeted award mechanism and clear contract specifications) is of utmost importance in attaining efficiency and equity objectives. Concerning the research questions in block 2, it is concluded that the main drivers for passenger satisfaction are not –as is suggested in more technical oriented PT studies- restricted to core attributes such as speed, trip frequency and reliability, but also encompass peripheral attributes such as personnel/drivers behaviour and vehicle tidiness. Additionally it is concluded that age, PT mode choice, level of urbanization and negative social safety experiences, exert a great influence on satisfaction with PT. Regarding the effect of CT on satisfaction, a positive effect is demonstrated, however the effect is small (+0.06 points on a 10-points scale). This effect is probably highly correlated to introduction of new vehicles in the concessions. On attribute level, the attributes that contribute most to the change in overall trip satisfaction are *vehicle tidiness*, *on-board noise*, *ease of boarding/alighting from the vehicle* and *service frequency*. The attribute values that are linked to *information* and to *on-time performance* in the tendered regions are negative, meaning that the satisfaction with these attributes worsens in comparison with non-tendered regions. With regard to the research questions of block 3, it is concluded that contract renewal leads to a substantial reduction in operational costs. When a contract is renewed at least once, the costs fall by 10%. Contracts that are renewed at least twice even lead to an extra cost reduction of 6%, resulting in a total reduction of 16%. Subsidies fall even further. We did not find evidence that there is an effect of competitive tendering on operational costs, suggesting that the threat of CT is sufficient in a market in which the majority of concessions is competitively tendered. Finally, our results indicate a significant positive effect of contract renewal on (log) passenger kilometres. Renewing a contract results in a 7.6% increase in passenger kilometres.

7.2.2 Policy conclusions

Based on the empirical work it is concluded that the policy of the Dutch administration, which aims to increase satisfaction, efficiency and ridership in the PT sector by means of competition, is successful. We find that the immediate effect of competitive tendering on efficiency and satisfaction is (nearly) absent, suggesting that the threat of CT is sufficient in a market when the majority of concessions is competitively tendered. Our economies of scale results indicate that the geographical size of the current concession areas may not be altered without additional costs. From an operational costs perspective, our study suggests that there is no reason to increase (or decrease) the geographical size of the concession areas.

7.3 Recommendations

7.3.1 Policy recommendations

The performance and quality of PT systems should correspond as much as possible to the diverse demands of (potential) PT customers. It is therefore important for authorities and operators to acquire knowledge on the preferences and evaluations of customers. Authorities and operators may optimize their efforts by focusing their resources and strategies on retaining their existing customers rather than trying to attract new customers. In this respect it may be wise for them to seek the most cost-efficient measures and aim specific instruments and policies at specific target groups. For instance, we found that trip frequency and speed exert a strong impact on satisfaction. When considering several possible policies, PTAs should take into account that a policy aimed at increasing the service frequency to raise satisfaction is possibly not the most efficient method, as it may be very costly. A more cost-efficient measure may be to increase the travel speed, as such a measure latches onto both satisfaction and operational efficiency. Therefore, we recommend that PTAs should perform supplementary calculations of the costs associated with the measures. We further recommend that PTAs intending to use satisfaction evaluations as part of incentive payment schemes towards providers should complement these schemes with objective measurements of performance, such as reliability of operations and/or actual numbers of passengers transported.

From an operational costs perspective, our study suggests that there is no reason to increase (or decrease) the geographical size of the concession areas. When assessing the effects of CT, authorities should take the transaction costs of designing and implementing a competitive tendering regime into account. Finally, if the network conditions become too unfavourable, even under a competitive tendering regime, the costs and subsidy savings of contract renewal may run out. Therefore, PTAs should complement regulatory policies with infrastructural policies aimed at sustaining excellent network conditions for the PT system.

It is concluded in this thesis that the reform of the PT sector initiated by the Dutch government was successful. However there is room for improvement and optimization. Firstly: in non-complex situations such as the regional markets outside of the cities, there is possibly room for less regulation and experiments with free entrance of operators (competition on the road). We recommend authorities to investigate whether these strategies are feasible. Second, related to the costs and subsidy savings of contract renewal under a CT regime, we showed that transaction costs may be substantial. Therefore we recommend PTAs to take the level of transaction costs into consideration when making strategic decisions on the size of the services to be procured, on the award mechanism, and on contractual issues such as duration, complexity and contract type. Further we recommend authorities in evaluating deregulation and decentralization policies, to explicitly take account of the transaction costs effects of these policies. Finally, we noticed some inconsistencies in contractual arrangements made by PTAs and concluded that the combination of net-costs contracts and input controlled

governance that is dominant in the Netherlands may be suboptimal with regard to subsidy reduction. If input-control is favoured and subsidy reduction is the prime objective of PTAs, we recommend gross-costs contractual arrangements.

7.3.2 *Recommendations for further research*

We studied the drivers of satisfaction with PT services and the impact of CT on satisfaction. These studies were performed on satisfaction evaluations of existing PT users only. This implies a lack of generalizability of the outcomes to non-PT users. More satisfaction research should be undertaken on non-captive users and non-PT users and specifically on the relationship between car availability and PT service satisfaction, as the ultimate objective of PTAs is to stimulate the shift to more sustainable modes.

In this study we took the perspective of the steering possibilities of PTAs in a tendering environment. We touched upon a number of drivers of satisfaction with PT, but it is probable that other drivers of interest remain to be revealed. In particular we recommend more research on the actual duration of travel time elements and on thresholds, keeping in mind that the drivers of satisfaction may be either more general or case-specific. Our study shows that in the PT sector segmentation matters; however, we shed little light on why it matters. We recommend further research in the PT sector focusing on the distinction between general and situational circumstances that exert an influence on satisfaction. General circumstances can be defined as those that are universally valid, as opposed to situational (case-specific) circumstances that influence satisfaction only under specific conditions and/or in an indirect way. Age, for instance, is an exponent of a general determinant, and urbanization is an example of a situational explanatory variable. It is most likely that the actual service performance plays a major role in explaining the satisfaction differences between urban and rural areas, but it may also be the case that attitudes towards PT differ between city dwellers and village dwellers. More research efforts should be directed towards these possible determinants of satisfaction with PT.

We empirically studied the relationship between CT and satisfaction, and between CT and ridership. The scope of this thesis was not directed to the relationship between satisfaction and ridership. As PT is an intermediary service, we already remarked in Chapter 4 that PT demand is inelastic, and therefore a strong and direct positive relation between satisfaction and ridership is not plausible. Furthermore, such a relationship is very hard to identify as there are many disturbances. However, as quantitative studies on this subject are scarce, we recommend to study this topic in more detail.

Our analyses of the efficiency effects of CT are focused on costs, subsidies and ridership only. Therefore, we cannot assess the total welfare effects of regulatory change. We did not analyse the transaction and monitoring costs in detail, for instance, nor did we analyse the changes in the level of service, fare increases and external effects due to CT. Consequently,

to assess the overall effects of regulatory change in the Netherlands, a comprehensive social welfare analysis is necessary. We concluded that the threat of competition may be sufficient to reach government goals. We recommend studying the effects of the threat of competition in more detail, for instance by performing case studies on the content, procedures and political pressure exerted on publicly awarded contracts under a CT regime. In Chapter 2 it was concluded that contract type may be an important efficiency driver in the hands of PTAs. In the survey data for the Netherlands however, only information on net-costs contracts is provided. Therefore it was not possible to empirically test the relationship between efficiency and contract type. As this topic is relevant, we recommend collecting data for concessions granted under gross-costs and perform further analyses on contract type in relation to costs and subsidies. Another interesting research item in this context concerns analyses on the effect of contract incentives on the one hand and efficiency and satisfaction on the other. In recent contracts in the Netherlands it is a rule rather than an exception that bonus-penalty arrangements are incorporated. What is the effect of these incentives, and what would be the appropriate level of incentives to be most effective? If sufficient information on contract details would become available, it would be possible to incorporate these kind of explanatory variables in the efficiency and satisfaction models we developed, and compare the results with those from other countries (see for instance Hensher and Houghton, 2004). Further study into the theory of incomplete contracts developed by authors such as Grossman and Hart (1986), and Williamson (2002) may be valuable in discovering and better understanding of the contractual relationship between PTAs and operators. In this respect to derive a more accurate estimate of the actual transaction costs made by both actors (including the ex post transaction costs of renegotiation and the costs of asset transfers between operators) than was possible in this thesis, is the final research challenge we would like to recommend.