

11TH CONFERENCE ON COMPETITION AND OWNERSHIP IN LAND TRANSPORT

SINGAPORE'S CASE OF INSTITUTIONAL ARRANGEMENTS FOR FARE AFFORDABILITY

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ABSTRACT

In public transport, achieving quality service and affordable fares with financial viability require concerted government intervention. Direct government intervention can jump-start the industry's development but the case for intervening in the affairs of commercial companies is more debatable. Government has to decide on the roles of public agency that can act as the final arbiter between the interests of the commuters and the commercial operators. A useful framework to understand and debate where government intervention sits or should sit, is to map it against the triangular relationships of fare (or price), service standards (or quality) and viability (or cost).

The price-cap model of fare regulation is feasible for public transport. For better public acceptance, a mechanism can be devised to allow for exceptional intervention by the fare regulation authority, to address any concerns regarding excessive profitability of commercial operators. Pegging the fare cap formula to macro-economic factors and sharing of productivity gains protect commuters, incentivise cost-efficiency and encourage non-farebox revenue maximisation. Periodic re-calibration of formula ensures currency and certainty. In a commercially driven industry structure and if market contestability is lacking, the regulatory agency needs a second policy lever to check on service quality and universal service obligations of commercial operators.

Ticketing technology is a key enabler for any fare structure reform. Provision of ticket payment services should be open to multi-commercial card managers but the regulatory

agency should retain the right to data use. A distance-based through-fare structure will eliminate the transfer penalty and support the hub-and-spoke model of public transport system. Fare structure reform can be done together with annual fare adjustments, but supporting infrastructure for integrated information services should be in place. A key challenge for the regulatory agency is to develop a revenue apportionment model that caters to both commercial and commuters' interests.

Fare affordability can be tracked using an indicator based on a characteristic household that is representative of the public transport users. Community-led financial help to the lowest quintile group is more targeted and it builds direct constituency relationships. Social fare introduction should be preceded by clear social objectives and such fares should be linked to the standard fare structure.

This paper discusses how Singapore attempts to develop and effect a fare review mechanism, carry out fare structure reform and track fare affordability, from a practitioner's perspective. The aim is to achieve quality service and affordable fares with financial viability.

INTRODUCTION

In Singapore, the provision of public transport is based on the concept of a triumvirate partnership. The institutional arrangements are such that the government provides the transport infrastructure (such as MRT stations and tracks and bus interchanges), the commuters pay for the operating costs of the service, while the operators or service providers extract efficiency dividend within the regulated service standards and fares.

As a result, public transport is operated on a commercial basis without direct operating subsidy from the government. Fares for trains (or rapid transit systems (RTS)¹) and buses are regulated by the Public Transport Council (PTC)². Provision of services is regulated by two agencies, viz. the PTC and the Land Transport Authority (LTA)³.

Given this institutional arrangement, the challenge for Singapore policy makers has been to keep it attractive, affordable and sustainable in the interests of three key stakeholders, viz. commuters, commercial operators and government/authorities. To bring about such outcomes, the adopted approach is to focus on creating value out of clear linkages between fare (or price), service standards (or quality), and viability (or cost).

This challenge is even more evident since the launch of the Land Transport Master Plan in 2008, from which there has been a series of fundamental changes being charted out or in the process of being implemented.

¹ RTS comprises both the mass rapid transit (or metro) systems and light rail systems.

² The PTC is an independent decision-making body mandated, by statute, to safeguard public interest by keeping bus and RTS fares affordable while securing the long-term financial viability of the public transport operators (PTOs).

³ The LTA is a statutory board that spearheads land transport developments in Singapore. It regulates RTS services while the PTC regulates bus services. For fare regulation, the LTA is the technical adviser to the PTC.

This paper discusses the institutional arrangements to develop and effect a fare review mechanism, carry out fare structure reform and track fare affordability, from a practitioner's perspective. It focuses on how Singapore attempts to do so within an overall framework of designing policy intervention to manage and optimise price, quality and cost. The aim is to achieve quality service and affordable fare with financial viability.

AN OVERVIEW OF GOVERNMENT INTERVENTION

Since the independence of Singapore in 1965, the government set housing and employment policies as top national development priorities and put in place the beginning of a master planning mechanism to transform the city-state into a modern economy. Government intervention in public transport started with the 4-year comprehensive land-use transportation study (1967-1971). Among the key recommendations, the study called for the development of a good public transport system and to promote its use. Since then, there has been consistent government effort to steer the public transport industry towards economic efficiency, balanced by social considerations.

Today, the outcome is self-evident: people and commerce move efficiently in a compact urban environment in a city-state of 4.2 million people on an island of 700 sq meters. The overall modal split in favour of public transport (bus, RTS and taxis) is 62% for the peak periods (i.e. mainly work-purpose journeys) and 58% for the whole day. On bus and RTS alone, the average daily journeys is about 3.5 million. Daily ridership is 4.9 million passenger-trips. Commuters enjoy a regulated quality public transport that is operated on a commercial basis and charging affordable fares. By comparison, the performances of Singapore's public transport fared well in terms of low operating cost and full cost recovery ratio (**Table 1** overleaf).

Learning from Restructuring of Industry Players

In 1971, the government took a major step to amalgamate the 10 bus companies existing then and grouped them into three regional operators. Despite the restructuring, the transport situation did not improve. Commuters continued to have to put up with frequent bus breakdowns, under-operation of bus services, irregular routes and piecemeal fare structures. The major operator then, the Singapore Traction Company (STC) had to close down due to financial losses.

The government took another decisive step in 1973 to merge all the bus companies to form one single company – Singapore Bus Services Ltd (SBS). A team of government officials was sent to head and manage the new company. They had to clean up the outdated financial practices and put in commercial prudence. They improved productivity by reducing wasteful duplication of services and harnessing economies of scale. That was a significant immediate and direct intervention by government to significantly improve public transport services. By 1978, the company was generating reasonable returns to be listed on the stock exchange. This injected even greater commercial discipline in the provision of public transport services.

Table 1 – Revenue, cost and recovery ratios city comparison

Performances of Public Transport Operations by Cities				
City	“Standardised” ¹ fare revenue per trip (euro cents)	Standardised” operating cost per passenger-km (euro cents)	Farebox ratio ²	Market share of journeys by public transport (%)
Singapore	36.7	4.4	126.0%	45.7
Hong Kong	78.7	7.1	157.0%	73.9
Prague	12.9	9.0	30.5%	54.2
Budapest	20.0	11.0	72.5%	55.9
Vienna	31.6	14.4	48.5%	46.6
Helsinki	36.7	9.4	53.0%	34.6
Marseille	44.9	36.1	54.0%	17.2
Paris	47.5	15.0	45.5%	27.5
Madrid	59.9	12.3	51.5%	30.2
Berlin	59.9	32.4	42.5%	33.2
Copenhagen	70.2	13.1	68.0%	15.0
London	89.6	18.3	81.0%	26.8
Manchester	112.4	26.3	96.0%	11.8

(1) “Standardised” fare and cost includes discount fares and operating expenditure, excludes depreciation

(2) Revenue divided by operating costs as a percentage

Source: LTA Land Transport MasterPlan 2008, data source from UITP Mobility in Cities Database

From the outset, the government knew that a commercial monopoly was at best as quick way to jump-start the industry and it should be limited to achieving that policy objective. Therefore, the market was opened up for a second commercial operator to compete and benchmark with SBS. Trans-Island Bus Services (TIBS) Ltd entered the market in 1983, starting with a few regions and services that were carved out from the SBS and given to them. TIBS grew and was also listed on the stock exchange.

A notable change was that TIBS brought a more pro-customer service philosophy into the industry. Service rivalry was created between SBS and TIBS, and as a result, commuters benefited from improved service quality.

In 1987, SMRT Ltd was formed to operate the rapid transit system (RTS). It was an offshoot from the in-house operation division of the MRT Corporation then, a government’s entity that built the system. Again, from the outset, the government wanted the RTS to be commercially operated, with fare revenue covering the operating cost. SMRT grew, and in 2000, it was also listed in the stock exchange, the same commercial approach used on SBS and TIBS.

With three players in the market – SBS and TIBS running bus services and SMRT operating RTS network – the government also wanted the merits of service integration to be put in place. From the outset of revenue service of RTS in 1987, it prompted the three players to set up a jointly owned commercial company, Transit Link Pte Ltd. Its roles were to plan and integrate bus routes with RTS network, to provide common fare-card ticketing and revenue apportionment system and to provide service information for seamless inter-modal transfers. It functioned as a cost-centre servant to the three players and trade-offs were thus internalised among the operators. This meant that the burden of planning for inter-operator co-ordination fell on the commercial operators rather than the government and that the operators had to publicly front the contentious issue of bus service rationalisation exercises that accompanied

the introduction of RTS revenue services. However, as discussed in a further section of this paper, all these changes to services would have to be scrutinised and approved by the Public Transport Council (PTC).

In 1999, the government decided to adopt the concept of multi-modal public transport industry and wanted to groom a second RTS operator for benchmarking with SMRT, similar to the approach used in introducing TIBS to benchmark SBS. So, it put up the new North East Line for contestability between SBS and TIBS but not SMRT. In 2000, SBS became the first multi-modal public transport operator after it secured the right to operate the new North-East Line. It then changed its name to SBS Transit. Soon after, SMRT also became a multi-modal public transport operator when it absorbed TIBS in 2001. This duopoly of public transport operators (PTOs) – SBS Transit and SMRT - has prevailed ever since.

The Singapore way of strong and direct government intervention to jump-start industry development and tamper with the affairs of commercial companies may be controversial, however desperate or warranted the situation may be. But the approach is undeniably nothing short of outcome-focused pragmatic problem solving based on economic way of thinking and sensible trade-offs. Granted that there is the presumption of political will and stability to enable such interventions. Supporting this argument is the recent Seoul's case of bus reform in which -drastic intervention by the city authority was a critical success factor.

In terms of industry structure, ensuring commercial viability from the outset is critical in the Singapore case. This means government intervention is almost always designed to best harness the profit incentive of private companies to maximise revenue and maintain cost efficiency. Moreover, as compared to a system of complete state provision of public transport, Singapore's hybrid system of strong government intervention coupled with commercial provision has merits in promoting greater efficiency.

Learning from Establishing a Regulatory Framework

In 1971, the government set up the Bus Service Licensing Authority (BSLA). The approval of fares was directly under the government. By the mid-1980s, soon after the massive public outcry and taxi hirers' reactions to the contentious taxi fare adjustment, it became clear to the government that there was need to have a wider community representation in the decision making process on public transport matters. The intention was to de-politicise the public pressure as far as it could achieve. The window of opportunity came in 1987 when Singapore was about to run its first RTS network. A new fare structure and bus route changes had to be decided and implemented to ensure long-term viability of RTS, given that it was a heavy investment by the government.

In 1987, the Public Transport Council (PTC) was instituted as an independent decision-making body to replace BSLA. Its role was expanded to safeguard commuters' interest by ensuring adequate public transport services at affordable fares and at the same time ensuring the long-term viability of public transport operations. The PTC comprised 15 members from a wide cross section of the society from unions, academia, grassroots organisations, media, legal, logistics, accountancy and financial, business fraternity. This permitted a wide representation of views aimed at making PTC's decisions more acceptable to the commuters.

Since 2005, in addition to fare regulation and bus service licensing, the PTC's role has been further expanded to include bus operator licensing, enforcing bus service quality, regulating ticket payment services and enforcing penalty fees to check fare evasion. In 2008, new powers were given to allow the PTC to carry out public transport fare reform in preparation for the implementation of a distance-based through fare structure.

Today, public transport operators must comply with the stringent basic bus quality of service (QoS) standards regulated by the PTC. Performance results and penalty imposed are published 6-monthly. For RTS, they have to comply with the QoS set by the Land Transport Authority (LTA), the licensing agency on RTS.

In effect, the PTC acts as a final arbiter between the interests of the commuters and public transport operators. The role of PTC is not just to regulate and ensure that commuters get the best from the public transport services, but also to ensure that public transport companies are sustainable in terms of financial viability and that they are not asked to provide services that are unjustifiable.

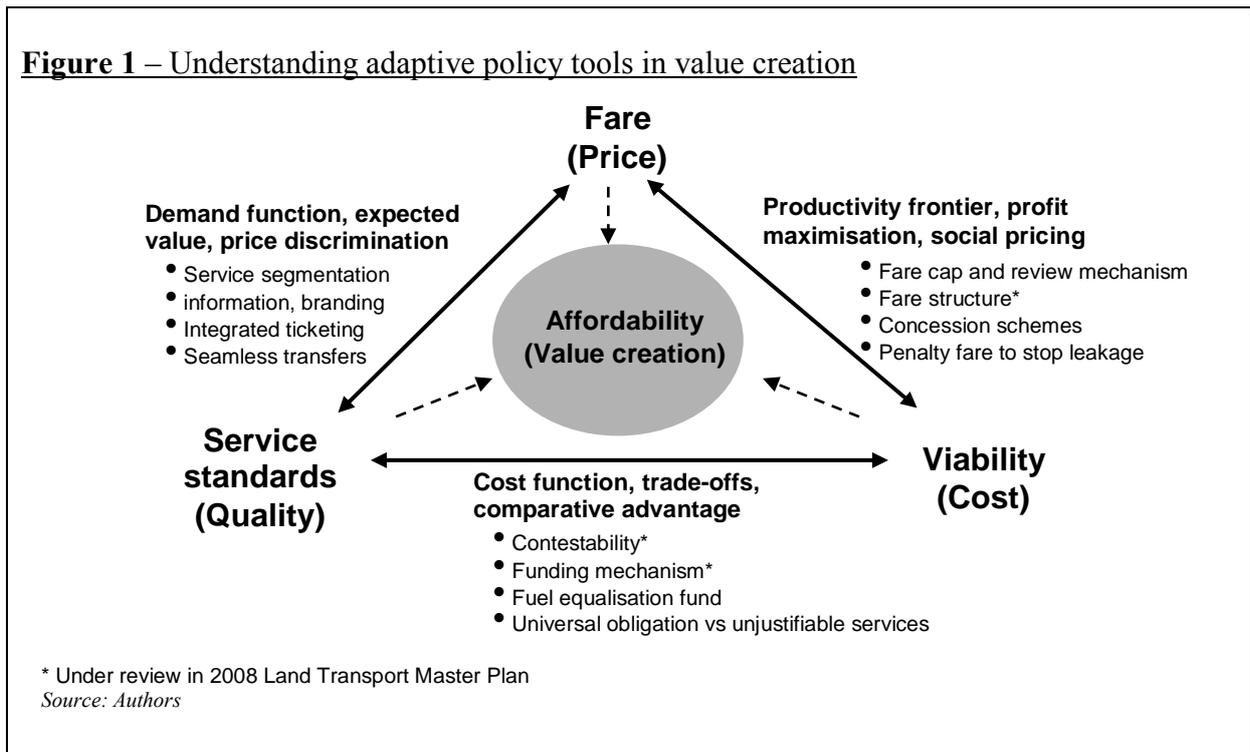
Mandating the PTC as a public agency to independently balance the considerations in its decision-making is a unique feature in the regulatory framework. The under-lying assumption is the belief that commercial operators are best placed to optimise schedules and yields if they are made to bear full fare-box revenue risks, as long as the minimum standards for service delivery and universal service obligations continue to be regulated by the regulatory agency. If such risks are to be borne by the government, as in the case of a competitive service procurement regime in other cities, the agency's balancing role would become less relevant.

Learning from Adaptive Policy Tools

Government intervention in structure and agency roles is necessary but not sufficient. At best, structure and agency roles align the directional goals and facilitate policy implementation. Creating value should be an outcome sought because it demands that agency and producers of services be closely in tuned with both those who supply – the public transport operators - and those who consume – the commuters. A conception of this value creation is affordability, not just for commuters, but also from perspectives of the state and service providers as a whole. Affordability in this conception means achieving quality service and affordable fares with financial viability.

Pivoting this value creation is the triangular relationships of fare (or price), service standards (or quality) and viability (or cost). **Figure 1** overleaf attempts to organise the interactions among them and map out the economic concepts that are directly relevant when designing intervention. Organised in this conception of interactions, it serves as a useful framework for understanding and debating where each intervention sits or should sit on the triangle, their economic rationale, and how each intervention contributes to the broader value creation.

Figure 1 – Understanding adaptive policy tools in value creation



Gleaning from the evolving policies that Singapore has implemented, the various tools used to manage the interactions are as summarised in the Figure 1. When discussing such tools, two contextual points need to be highlighted. First, there is currently little or no competitive pressure to improve services and minimise cost, beyond requiring the operators to meet the service standards and some benchmarking rivalry between them. Among other policies, this current shortcoming is being addressed in the 2008 Land Transport Master Plan (LTMP). It has committed to gradually introducing contestability into the industry. Review of public transport funding mechanisms and fare structure reform are also underway as part of the LTMP.

Second, the PTC has consciously kept fares (or price) and service standards (or quality) as separate degrees-of-freedom when exercising intervention. This flexibility allows the regulatory agency to use them to augment and support the broader push-pull transport strategy to encourage public transport usage over private transport. For example, the expansion of road pricing scheme to manage road congestion has to be coupled with raising the service standards without increasing fares. Another example is that the expansion of RTS network requires increasing feeder connectivity resources and curtailing wasteful duplicated services without corresponding adjustment to fares.

Among the interventions mapped out, three recent policy tools – instituting fare regulation, reforming fare structure and tracking fare affordability – are discussed in this paper.

INSTITUTING FARE REGULATION

Early Years of Price-cap Regulation

In 1997, the PTC decided to adopt the price-cap model for the regulation of public transport fares with effect from 1998. The fare adjustment cap formula adopted was “CPI + X”, where CPI was the change in the Consumer Price Index over the preceding year and “X”⁴ was set ex ante for a number of years, taking into consideration the inflation rate, wage changes and national productivity gains. “X” was intended to compensate the operators for net cost (after considering wages and productivity) increases beyond inflation.

The fare cap model was not meant to be automatic as it was reckoned that the public was not ready for automatic adjustment in public transport fares. As such, fare adjustments (within the cap) were determined and approved by the PTC based on operators’ cost justifications.

In 2002, there was a heated political debate on the fare increase given as it coincided with the weak economic conditions then. The main unhappiness centred on the issues that the fare adjustment cap formula lacked transparency and was not responsive to economic conditions. There was also a perception that the formula favoured the public transport operators (PTOs), as optically, it looked like a cost-plus formula. This gave rise to a policy review for a new fare mechanism in 2004 undertaken by an appointed committee⁵.

The approach of appointing an independent committee to review and to debate its recommendations in the parliament was a considered move to allow greater participation. Recognising that fare revisions had always been an emotionally charged issue, a calibrated consultation was done through focus groups rather than a large scale general public consultation exercise to avoid turning it into a huge public debate, which could possibly detrack the review and stalled the decision. Whilst the extent of engagement was limited, it was not lacking in views aired, preferences registered and suggestions heard.

Fare regulation or the exercise of oversight on fare setting by an agency is common in other cities. Singapore is no exception. The price-cap model of economic regulation is also not new and it has been used elsewhere, though more commonly adopted in the utility industry rather than in the public transport sector. When designing the intervention, it is crucial to pursue an acceptable approach, with political support and representation.

Establishing a Fare-cap Formula and Fare Review Mechanism

Various economic models on price regulation were considered. No evidence pointed to a single superior model for fare regulation. The price-cap model for the regulation of public

⁴ Due to the complexity in deriving “X”, the actual derivation of “X” was not made public. The value of X was set at 2% for 1998 to 2000, and at 1.5% for 2001 to 2005.

⁵ Led by the chairman of the Government Parliamentary Committee (GPC) for Transport.

transport fares was retained, as it provided incentives for the PTOs to be cost efficient and it was also the preferred model of various stakeholders⁶.

For any price-cap model, the challenge had always been in the determination of the appropriate price index and the level of productivity extraction. The review studied the cost structure of the PTOs and found that the manpower cost was the largest component, constituting about half of the PTOs' total operating costs. The other half comprised maintenance, fuel and energy costs, depreciation expenses, and other operating expenses. Thus, wage changes were captured separately in the price index, while the rest of the cost items were accounted for using the Consumer Price Index (CPI). This separation would improve the responsiveness of the formula to CPI and wage changes. The price index mimics the cost structure for use in the fare adjustment cap formula as follow:

$$\text{Price Index} = 0.5(\Delta\text{CPI}) + 0.5(\Delta\text{WI})$$

where ΔCPI is the change in Consumer Price Index over the preceding year, and ΔWI is the change in Wage Index, defined as the average monthly earnings (overall average by industry) adjusted for any change in employers' contribution to the government's central provident fund⁷.

In setting the productivity⁸ extraction, there was a need to balance motivating the PTOs to be productive and allowing commuters a share of the productivity gains. If year-on-year productivity gains were fully extracted, the PTOs would be discouraged from maximising productivity gains, given that the greater the productivity gains achieved, the smaller the fare cap would be. It was thus decided that the extraction would be set and fixed for three years in the first instance, based on the principle of equal sharing of the PTOs' past average annual productivity gains⁹ between the PTOs and commuters. The new fare adjustment cap formula was therefore:

$$\text{Fare-cap} = \text{Price Index} - 0.3\%$$

The previous practice of relying on cost justifications gave the PTOs no incentive to reduce costs and improve efficiency. The reliance on cost justification blunted the price-cap mechanism and created confusion on the economic reasoning for fare regulation. It was therefore decided to shift from the cost justification practice to a more deterministic mechanism, in which the PTC can only moderate the quantum of the fare cap under two explicit circumstances:

⁶ Represented in the focus group hearings held by the committee.

⁷ This is compulsory saving fund in which both the employer and employee contribute a certain percentage of the monthly income for the employee's retirement use. A statutory board is mandated to administer the account and it can be used to fund employee's housing, healthcare, insurance and safe investments.

⁸ Defined as the change in value added per unit of labour input.

⁹ For the period between 1997 and 2002, the average productivity gain was about 0.6%. Equal sharing would mean setting the extraction at half of 0.6%, i.e. 0.3%.

- when there were adverse economic conditions (in terms of GDP growth and unemployment rate); or
- when there was significant deterioration in the overall affordability of public transport fares.

To further safeguard commuters' interests, the PTOs' Return-On-Total-Assets (ROTA)¹⁰ values would be benchmarked against companies in a similar industry and of comparable risks at the annual fare review exercise. This would serve as a reality check on the fare levels hitherto approved by the PTC.

The reason for rejecting the rate-of-return model for fare review is mainly because of the difficulty in prescribing an acceptable or allowable rate-of-return and the lack of incentives for the commercial operators to contain costs. Given the commercial nature of the operators, every fare adjustment tends to be accompanied by persistent public calls for the profitability of the operators to be controlled. This is not a surprising reaction considering the current lack of contestability in the industry. The public calls to rein in profitability of operators contradict the price-cap model. As a way to address this, the operators' return-on-total-assets (ROTA) is treated as reality check for intervention only when there is a compelling reason for the PTC to do so.

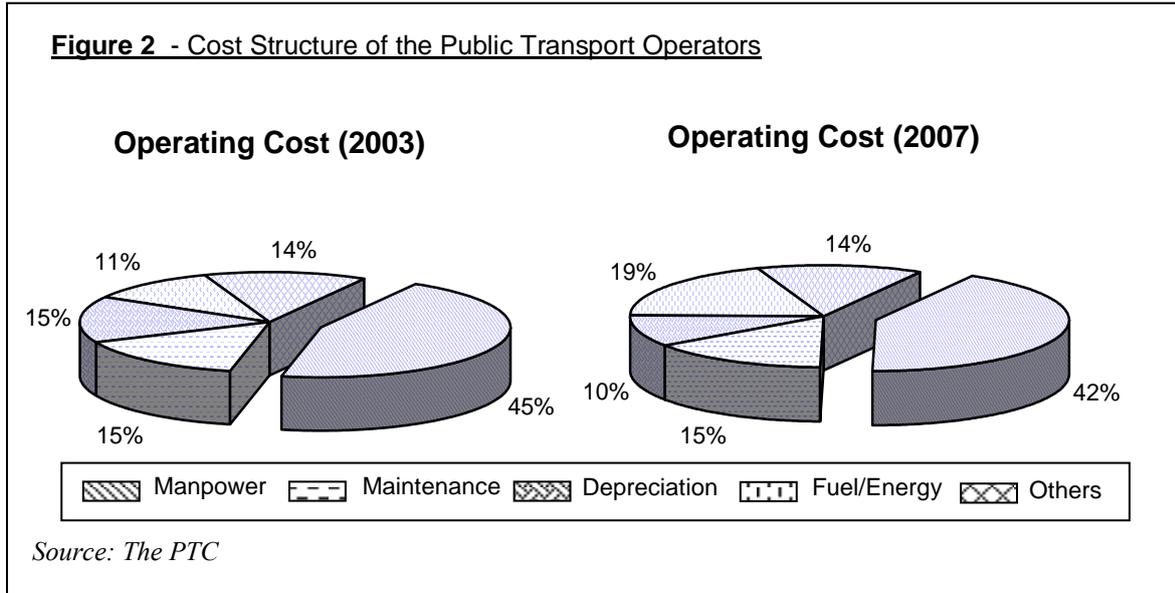
Even then, the comparison using ROTA values is not easy, as judgement calls are needed to determine whether the ROTA values are deemed excessive or otherwise. Nonetheless, having a form of reality check on profitability can somewhat help to alleviate the public's concern over profiteering by the operators. In any case, the fear of escalated run-away profitability is curbed, as the setting of productivity extraction in the fare-cap formula after three years will allow the claw-back of the returns for sharing with commuters.

Re-calibrating the Fare-cap Formula

In 2008, the PTC undertook a review of the fare-cap formula. It looked into the relative weights for Δ CPI and Δ WI, and the productivity extraction component. As there was no significant change in manpower cost (see **Figure 2** overleaf) that remained a large part of the operators' cost structure, it was decided that the same relative weights of 0.5 be kept for both the Δ CPI and Δ WI.

In setting the new productivity extraction component, the same principle was used on equal sharing of the operators' productivity gains and commuters. Based on the average productivity improvement of 3.0% achieved by the public transport operators in the past five years (2003 – 2007), the extraction level was therefore set at 1.5% (previously 0.3%).

¹⁰ ROTA = Net Profit After Tax divided by Total Assets.



Given the impending structural changes arising from the 2008 LTMP, the validity period of the revised formula was also lengthened to five years so as to ensure greater certainty in safeguarding commuters' interests. The revised fare formula, which applies from 2008 to 2012, is now:

$$\text{Fare-cap} = 0.5(\Delta\text{CPI}) + 0.5(\Delta\text{WI}) - 1.5\%$$

The judgement call to determine the coefficients in the Price Index and productivity extraction in the fare-cap formula should not be arbitrary. To ensure currency and certainty, they should also reflect changes in cost structure and the productivity achieved. A balance has to be struck as to how long the formula should be kept before re-calibration. Doing so frequently will increase responsiveness but at the expense of certainty. As the variables CPI and WI are macroeconomic factors beyond operators' control, frequent re-calibration will increase the revenue risks and thus undermine the incentive element in productivity improvement. If introduction of contestability for the market is impending, ensuring certainty is necessary to reduce undue risk pricing. This is even more crucial in the Singapore's case as the operators will continue to bear full revenue risk when a new tendering regime is introduced.

Implementing Fare Adjustments

Since 2005, three rounds of fare revision have been successfully held using the Fare-cap = Price Index – 0.3% formulation and review mechanism. The average fare increase was 2.4% in 2005, 1.7% in 2006 and 1.1% in 2007. In absolute terms, the increases were small, ranging from one to three cents¹¹ for users of contactless smart cards, and ten cents for cash fares.

¹¹ Three Singapore cents is about two US cents.

In the first two exercises (2005 and 2006), the PTC did not intervene to vary or reject the fare adjustment amounts determined by the fare-cap formula, owing to favourable economic conditions and stability in the affordability indicator. Moreover, the PTOs' ROTA values were also deemed acceptable then. But in 2007, the PTC rejected the adjustment for RTS fares even-though the 2007 fare cap was 1.8% on the basis that the ROTA reality check on the main RTS operator, SMRT, was judged excessive. This rejection effectively brought the revenue quantum down to 1.1% instead of the 1.8% fare-cap.

The rejection using ROTA reality check is the first time the PTC has done so. Investor sceptics challenged the decision but commuters were somewhat more receptive. More importantly, it has demonstrated that the PTC executes its prerogative that is consistent with what it has been entrusted to do in the fare review mechanism since 2005. In short, the reality check in the mechanism is proven real.

In 2008, the re-calibrated formula $\text{Fare-cap} = \text{Price Index} - 1.5\%$ was used for the first time. However, unlike the previous years, the revision in 2008 has the added dimension of the policy objective to move towards the distance-based through-fare structure where a single boarding charge should only apply regardless of the number of transfers made by a commuter in the entire journey from origin to destination. As such, besides the regular revision due to the fare-cap formulation, there is a need to increase the existing 25 cents transfer rebate¹² as part of the transition towards the eventual elimination of the existing transfer penalty. In this fare adjustment, the operators were still given the fare-cap increase of 3.0%, but they were made to share the majority (or 2/3rd share) of the cost for the 15 cents increase in transfer rebate, given their healthy returns. This resulted in an effective net fare increase of 0.7% for the year.

In short, since 2005, there have been two years in which the operators did not get the revenue increase from the full fare-cap quantum. First was in 2007 in which the RTS fare was not adjusted owing to ROTA reality check. Second was in 2008 in which commuters were given higher transfer rebates as a transition to distance-based through fare. Fare adjustments and operators' ROTAs over the years are as shown in **Table 2** overleaf.

Even with such a fare regulatory framework in place, public reactions are not easy to be de-politicised, with persistent public calls for greater transparency and clarity of the decisions regarding fares made by the PTC. The existence and experiences of the PTC have well positioned it to be a ready vehicle to implement the new fare review mechanism that is not only more transparent to the public, but also allows the PTC greater certainty and clarity in achieving its challenging mission. Without an agency role like the PTC, instituting such a fare regulatory framework would likely have been differently designed and possibly taken a different course.

¹² In Singapore cents. The current bus and RTS fare structures are distance-based but are separate. Journey involving multiple transfers incurs fare transfer penalty. To reduce this, a transfer rebate is given for valid transfers.

Table 2: Fare adjustment and ROTA of the two public transport operators (PTOs)

Year	2003	2004	2005	2006	2007	2008
Fare adjustment cap	1.1%	2.0%	2.4%	1.7%	1.8%	3.0%
Actual fare adjustment	Nil	Nil	2.4%	1.7%	1.1%*	0.7%#
ROTA – SBS Transit (Bus & RTS operations)	2.1%	4.6%	6.5%	7.0%	8.6%	7.7%
ROTA – SMRT (Bus & RTS operations)	5.1%	6.0%	9.1%	11.4%	11.1%	12.9%

Notes:

Fare cap formula was reviewed in 2005 and re-calibrated in 2008

ROTA = Net Profit After Tax divided by Total Assets. These values were computed using operators' proforma statements submitted to the PTC annually. The statements were prepared according to standardised asset depreciation as set by the PTC.

* Adjustment to RTS fares was rejected.

Operators made to bear the increase in transfer rebate to ease the transition to distance-based through fare

Source: The PTC

Also, given the commercially driven duopolistic industry structure and the absence of market contestability, the policy shift to a fare-cap model could not be tenable without a commensurate regulatory oversight of service quality imposed on the operators¹³. The need for a second regulatory lever is obvious for two reasons. First, with a built-in incentive for the operators to reduce costs and maximise revenue gains in the fare-cap model, service quality might suffer unless there are some forms of minimum standards to safeguard public interest. Second, commuters will link the deterministic fare adjustment with service quality and demand that value-for-money of services be ensured. This is particularly so if fare adjustment is to be granted annually.

Therefore, in tandem with the fare regulatory framework, regulatory oversight on bus services¹⁴ had to be tightened. A new set of quality of service standards (QoS), including compliance with universal service obligations, for bus services was launched in 2006, just prior to the fare revision exercise. This proved to be positive move as, to a large extent, it took the edge off public reactions to the fare adjustment issue.

REFORMING FARE STRUCTURE

Ticketing Technology and Regulation as Catalyst

The first integrated ticketing system (using stored value magnetic card) on buses and RTS was launched in 1991. The technological limitation then was that fares had to be based on

¹³ Arguably, the pros and cons of this approach can be contentious.

¹⁴ The RTS service was also tightened by the LTA, the licensing authority on RTS service.

multiples of five-cent¹⁵ currency denomination. Also, unlike the RTS closed system that had fare-gate control, the bus system was an open system based on entry process activated by commuters upon boarding.

In 2002, the magnetic card system was replaced by the contactless smart card (CSC) technology. Adoption of this technology for both buses and RTS was significant on two counts. Firstly, fare adjustment quantum could henceforth be made in multiples of the smallest currency denomination of one cent, providing greater flexibility in fare setting. This in turn rendered the distance-based fare adjustment quantum more palatable to commuters. Secondly, the bus loading and ridership could be accurately determined as boarding and alighting points were captured by both entry and exit processors on buses, enabling rigorous impact analysis of possible fare adjustment options.

In 2006, the PTC was mandated to license the use of CSC as mode of payment for public transport fare. The purpose is to open up the market for the provision of ticket payment services to other commercial card managers and not limit the market to the current single card manager. This will spawn more ticket service offerings for commuters and keep the CSC transaction cost competitive. A new regulatory and licensing framework is now in place to let more card managers to enter the market. The ticketing system is also being upgraded to be ready to accept multi-card managers with effect from 1 October 2009.

The adoption of CSC technology has enabled the PTC and LTA to obtain vital information related to fares and ridership¹⁶. For the first time since 2005, the regulator can rely on its own fare model and carry out independent impact analysis to check the submissions as claimed by the operators, reducing the problem of asymmetric information with regard to fares and pricing impact. In other words, ticketing technology is a key enabler for fare structure reform. Retaining the right to access and use the data generated by fare system is essential for the agency. The licensing framework already in place will enable such rights are safeguarded.

Review of Fare Structure

Designing a fare structure that is equitable and efficient is particularly challenging in multi-modal systems. There is a need to ensure that the different public transport services remain commercially sustainable despite their different cost structures and service roles (feeder/trunk) performed in a commuter's journey. In addition, the structure has to meet policy objective to encourage commuters to take the most efficient route without unduly penalising them for transferring between different services as it is not financially sustainable to provide direct services to all commuters.

During the early days, due to technological limitations, it was impossible to introduce a distance-based through-fare structure where there is a need for the fare system to track the exact journey profile of a commuter for fare computation. To overcome this limitation, the

¹⁵ Five Singapore cents is about three US cents.

¹⁶ This is because information ownership remains vested with the LTA which is the CSC ticketing system developer. In the previous magnetic card ticketing system, the information ownership was with the PTOs and both the PTC and LTA had to rely on them to provide the necessary information to evaluate pricing impact.

concept of a transfer rebate was introduced into the fare structure in 1991 as part of the overall efforts to integrate the bus and RTS fares. Under this system, a commuter will be given a transfer rebate to help partially offset the second boarding charge when he makes a valid transfer between the different services. Although, the transfer rebate system has worked well, it is a blunt tool and it does not fully offset the transfer penalty due to the non-linearity of the fare structure.

During the recent land transport review that led to the launch of the Land Transport Master Plan (LTMP) in 2008, a decision was made to introduce the distance-based through-fares given the implementation of the contactless smartcard integrated fare system. The aim of the new fare structure is to fully eliminate the transfer penalty where there will only be a single boarding charge for all journeys regardless of transfers. This will not only support the hub-and-spoke model of our public transport system but also encourage commuters to take the most efficient route for their travel.

Transitional Issues

In any reform of fare structure, there will be a transition cost to the various stakeholders. In Singapore case, the removal of the transfer penalty will cost more than a \$100 million and this requires the sharing of the cost between the operators and the commuters. Given the huge cost, it makes sense to adopt the strategy to spread out the transition over a few years so that the impact to both the operators and commuters can remain manageable. Also, given that there is already an annual fare adjustment in place, the fare structure reform can be packaged with the fare-cap quantum to ease the impact to both commuters and operators.

Therefore, as part of the annual fare revision exercise in 2008, the current fare structures were first fine-tuned to facilitate the full switchover to the new distance-based through-fare structure in 2010. In that exercise, the transfer rebate was increased from 25 cents to 40 cents to narrow the transfer penalty gap between a transfer journey and a direct journey. The existing distance bands in the fare structure were also extended to cover longer distances. This is to prepare for the charging of fares on a journey basis where the various individual leg distances will be accumulated for fare charging.

In addition, the necessary supporting infrastructure is also upgraded to facilitate implementation of the new fare structure. The LTA has launched a new journey planner to help commuters plan their journey based on different attributes such as journey time and cost. Real time bus information panels have been installed in major bus stop locations and real time bus arrival information are also provided to the mobile devices.

The design of the distance-based through fare structure is still in progress. Aside from fare policy and system design and development issues, one key challenge is to design an equitable revenue apportionment model that can cater to multi-operators in a multi-modal, multi-service offerings and multi-card managers environment and yet take care of commuters' interests.

TRACKING FARE AFFRODABLITY

Fare affordability can be measured in terms of an affordability index that is developed based on either theoretical or empirical approach. Theoretical approach relies on what it would cost given a pattern of travel and income, while empirical approach is based on what is actually spent on travel and actual income. Either approach has its merits and practical limitations in terms developing a meaningful indicator for tracking. The appropriateness of one over the other depends on the purpose to which the index is to be put. For instance, when comparing across cities, a synthesised index may be sufficient for study on socio-economic issues. In Singapore case, the empirical approach is used to construct an affordability indicator to track the impact of fare changes.

Annual Fare Affordability Indicator

Given that fare affordability is one of the key factors the PTC will consider in deciding whether to exercise its flexibility to vary or reject the fare adjustment quantum determined by the fare-cap, a robust indicator to track fare affordability is needed. Until the review in 2005, fare affordability had been monitored through the 5-yearly Household Expenditure Survey (HES)¹⁷. The indicators used then were:

- Average monthly household expenditure on public transport as a percentage of the average monthly household income; and
- Average monthly household expenditure on public transport as a proportion of total household expenditure.

The 5-year time gap for such information does not fit on with the annual fare revision exercise. Therefore, a new public transport fare affordability indicator has been developed to allow the PTC to track the affordability trend on an annual basis. The new fare affordability indicator is computed based on the percentage of household expenditure on public transport by a representative household that reflect the average public transport users¹⁸.

$$\text{Fare Affordability (\%)} = \frac{\text{Monthly household expenditure on public transport}}{\text{Monthly household income}}$$

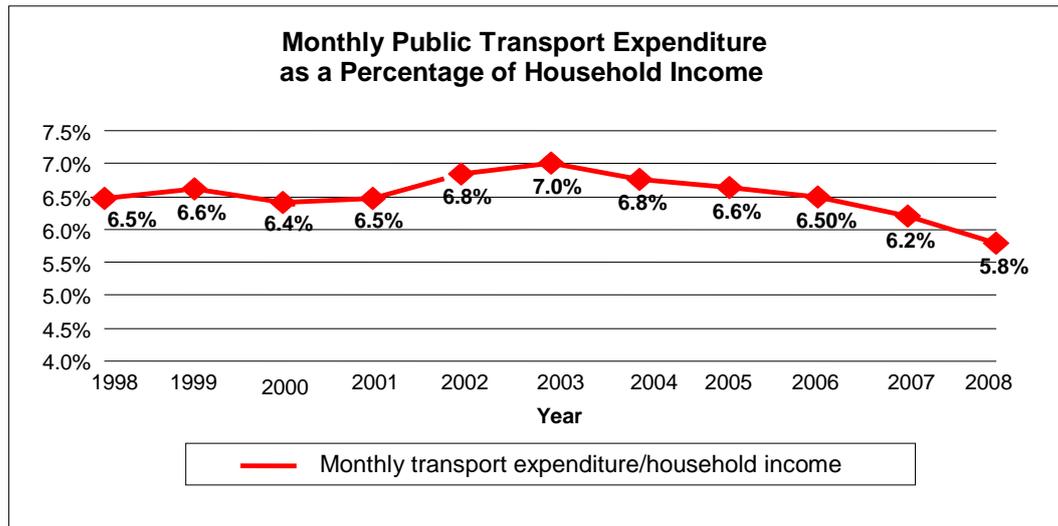
The representative household is constructed using information on the household income, expenditure, and travel data collected by the HES and Household Interview Survey (HIS)¹⁹. This indicator is used to track year-on-year changes in public transport expenditure and income, and it is validated every five years based on the latest HES and HIS results. **Figure 3** shows the fare affordability trend since the implementation of fare cap regulation in 1995.

¹⁷ Conducted by the Department of Statistics (DOS), Singapore.

¹⁸ They correspond to the second quintile of household income.

¹⁹ This is a regular comprehensive transport survey conducted by the LTA to ascertain changes in travel demand, pattern and preferences. The findings are used in transport modelling and planning.

Figure 3: Public Transport Expenditure as a Percentage of Household Income



Notes: Fare revisions took place in 2000, 2001, 2002, 2005, 2006, 2007 and 2008.

Source: The PTC

Fare affordability is a perennial concern. A continual upward spiral in fare and bus service quality will invariably impose a heavier burden on lower income households, which are practically captive to public transport. With the already widening income gap, this service-fare relation will become even more delicate, if nothing is done to ensure the fare affordability of public transport.

Therefore, the availability of an affordability indicator is crucial in the implementation of the annual fare revision exercise. The indicator can now be used to show and check on the trend of fare affordability. However, as the indicator is pegged to households with income in the second quintile, the affordability for households in the lowest quintile remains an issue.

Targeted Help for the Needy

To overcome this, a targeted community-led approach is adopted. Needy families, especially in the lowest quintile, can seek financial assistance from the grassroots or local community representatives on a whole range of necessities, healthcare, education, housing, jobs, food, etc, including transport. Notwithstanding this, the needy families still need additional help to cushion the adjustment caused by any fare increases.

Therefore, a public transport fund with contributions from the government and operators has been put in place since 2006. The aim is to provide transitional relief for the needy to adjust to fare changes granted under the fare-cap. It is disbursed through community organisations for wider and targeted outreach. It is positioned as a many-helping-hands approach in which constituents benefit directly. This has proven to be successful in making the annual fare increases more palatable to the lower income households.

Tackling Social Fares

A prevalent universal feature of urban public transport seems to be lower or concessionary fares for some defined social groups of commuters. The question is not so much whether the objective of maintaining affordable public transport is important or desirable for such social groups, but whether it can be practically and cost effectively achieved, as well as sustainable. In the case of Singapore, concession schemes are left to the operators to determine, based on their balance of commercial and social objectives. Though the PTC has the final say in approving the concessionary fares, the operators propose and front such offerings. Their public position is that such concessionary fares are and have to be cross-subsidised by full-fare paying commuters. This does exert some form of counter-pressure on increasing demand for concessions to be extended to cover more or larger social groups.

But offering concessionary fares for particular social groups need not necessarily be seen solely as a means to fulfil social objectives. Arguably, such offerings can in fact be simply a form of price discrimination to maximise income, no different from discounts offered to segmented market via service types or temporal differentiation. For instance, in the absence of clear social objectives, limiting concessionary fares to off-peak hours does suggest that such offering does perform, at least in part, the same income maximising function that the commercial operators seek to achieve. Such a phenomenon may arise if concession schemes are being left to the commercial operators to determine. In Singapore case, there is some resemblance of this price-discrimination in the offering of senior citizen concessionary fares.

Tackling social pricing is not insurmountable if there is a fare review mechanism and fare structure that can also take care of cross-subsidy on a sustainable basis. In the Singapore case, while the concessionary fares are approved under the fare-cap and review mechanism, the legacy fare structure is almost independent of or disjointed from the standard fare structure. Going forward, the concessionary fare structure should be reviewed with clear social objectives and to align it with standard fare structure in the ongoing fare structure reform exercise.

CONCLUSION

Achieving quality public transport service and affordable fare with financial viability require concerted government intervention. In restructuring the industry, direct government intervention can jump-start industry development. But the approach is debatable as it necessitates tampering with the affairs of commercial companies. This is a complex but necessary endeavour that calls for strong political will and stability. Whether this is transferable to other cities is debatable.

Government intervention cannot do without a robust regulatory framework. It has to define and decide on the roles of public agency. Instituting an independent decision-making body – like the Public Transport Council - with a clear statutory mandate can allow such a body to play role of the final arbiter between the interests of the commuters and the commercial

operators. This is crucial if commercial operators are made to bear full fare-box revenue risks and secure cost recovery without operating subsidy.

A useful framework to understand or debate where government intervention sits or should sit is to map out the triangular relationships of fare (or price), service standards (or quality) and viability (or cost). Fare regulation can be designed to manage the interactions between price (or fare) and cost (or viability) to achieve the outcome sought.

The price-cap model of economic regulation is feasible provided it is not saddled with the need to control the returns of commercial operators. For reasons of public acceptance, a mechanism can be devised to allow for exceptional intervention in fare setting by the agency. One way is to ring-fence commercial operators' financials and use the return-on-total-assets (ROTA) as a reality check against excessive profitability.

Whatever the fare-cap formula, it should be reviewed at intervals to re-calibrate the price index and productivity extraction. This ensures currency and certainty of the formula to incorporate changes in operating cost structure and to claw-back the returns for sharing with commuters.

If the industry structure is commercially driven and market contestability is lacking, fare-cap regulation is unlikely to be publicly tenable without a commensurate regulatory oversight of service quality. The regulatory agency needs another policy lever to check on quality of service standards, including imposing universal service obligations onto the commercial operators.

Ticketing technology is a key enabler for any fare structure reform. Provision of ticket payment services should be open to allow other commercial card managers. However, there is need to put in place a regulatory and licensing framework ticket payment services and agency should retain the right to access and use the data generated by fare system.

A distance-based through-fare structure will eliminate the transfer penalty. This will support the hub-and-spoke model of public transport system and encourage commuters to take the shortest route for their travel. Transition to such a structure is best done with the annual fare adjustment exercise. It should also be augmented with supporting infrastructure to provide the necessary integrated information services to commuters. A key challenge of such a fare structure reform for the agency is to develop a revenue apportionment model that caters to the commercial interests of multi-operators, in a multi-modal, multi-services and multi-card managers environment, as well as interests of commuters.

In order to track fare affordability, agency should develop an indicator that measures a characteristic household expenditure on public transport as a percentage of income. Targeted community-led assistance for the needy is necessary to help the lowest quintile group. Social fares should be preceded by clear social objectives and linked to the standard fare structure for consistent adjustment under the fare cap formula.

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