Problems of Retaining the Benefits of Regulated Bus Service with Competitive Entry

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Introduction

An ideal of urban public transport competition is the Hong Kong solution[1] in which regular buses, taxis, the Mass Rapid Transit system, trams, minibuses, and ferries provide a spectrum of service qualities and styles. Whilst the market for each's service is fairly well defined in that regular travellers are consistent in their modal choice and do not switch capriciously, the easy substitutability of at least one other mode (and more in many cases) means that there is latent competition between them, which will be activated by users any time of service inadequacy or if fare differentials change.

The other extreme is total free entry in which atomistic competition of small capacity vehicles tends to drive out larger buses, which are able to carry peak loads at low fares. This paper describes two situations; each is well short of the volumes that sustain six modes in Hong Kong, where alternatives to totally unregulated bus competition are being applied. The goal is to prevent crowding out of some quality/fare mixes now supplied, which would be to the detriment of large numbers of users.

1. Goals of Regulation

Before looking at the two case studies, we should consider public transport goals and the potential mutually supportive roles of regulation and the establishment of contestability. 'Regulation' is not the opposite of contestability; in many cases, regulation is required to sustain contestability. Regulation, in this context, means external interference by a government agency or a grouping of transport providers with a freely competitive market. The goal of any regulation should be to minimize the total cost of people movement within a conurbation, defining 'total' in its broadest sense, and including travel time costs, congestion, pollution, and the costs of all other activities for which public transport is a potential substitute.

There are costs in unfettered contestability in terms of markets not served. And, as shown in three case studies, regulators must make judgments about the balance between the interests of various public transport user groups and community goals such as pollution and congestion minimization.

2. Establishing and Sustaining Contestability

Hong Kong's six modes, ready to compete with each other and with none requiring subsidy, simplify the regulator's task, as the service / fares offer of each is kept in line with the competitive offers so as to achieve an optimal modal split. Where one or more of the modes are subsidized, for whatever reason, the situation is more complex.

In Delhi, the bus regulator has embarked on a change that will have the effect, often sought in theoretical analyses, of letting loose a large number of single-owner buses to compete on an established operator's routes but under an imposed maximum fare. This follows an earlier Calcutta example but with a more formal entry procedure.

In Harare, the maintenance of an unsubsidised urban bus service is challenged by the operation of illegal

'emergency taxis', which obviously fill a market need. The bus franchisee's competitive response to the 'emergency taxis — the competing premium-fare mini-buses — are themselves a threat to the viability of the regular bus services.

In both of these cases, many users have benefitted from the new contestability, but this has not automatically established a stable solution.

The main forms of contestability of urban bus markets are -

1. **open and continuous,**

2. **controlled service competition**

3. **periodic competition for the right to be sole operator,**

4. **permanent right to be the master operator but with tendered contracting of actual service provision to other suppliers**

5. **a mix of the these, serving differentiated markets but competing with each other at the margins.**

Naturally, there is a wide range of sub-classes, which incorporate aspects of these variants, and an equally wide range of administrative and monitoring options. Even a decision (formal or informal) to totally deregulate city bus operations creates reactions, which must be administered. For examples

- the deregulation decision in Sri Lanka was followed by a decision to privatize the para-statal buses, which requires administrative action to ensure that the newly privatized companies have a chance of remaining in business and that the experience and other assets are not wasted

- in Harare, the government's reluctance to control the emergency taxis, which operate in defiance of the bus company's exclusive franchise, has led to action by the bus company to protect its business, because it still has obligations to provide service on the all routes

- in Santiago, the natural competitive pressures of new, unregulated bus owners has created a need to control their access to congested city areas

The simple solution is to permit free entry and market-determination of fares, but the range of possible outcomes, from atomistic competition without any organization to cartels that increase fares to satisfy the wants of all participants, leads to other problems. Although 'associations' of free entrants have been praised for their stabilizing effects,[2] this 'stability' is not achieved without cost. The situation in Santiago, where associations have driven fares up much faster than the rate of inflation to support an oversupply of buses that creates heavy congestion in the downtown area without any commensurate benefit to passengers, is an example.[3]

2. Problems of Introducing New Styles of Service: The Harare Case

2.1 Harare's bus problem

Harare[4] is one of the last cities in Africa without formally approved competitive bus services, but it is also the last to have a regular scheduled service that operates without subsidy. Harare's success in this is often cited to regulators in South African cities where, under similar cost and demand conditions, the

scheduled bus services all receive heavy subsidy. Zimbabwe United Passenger Company Ltd.[5] (ZUPCO) has a monopoly franchise for stage carriage services within a 30 km radius of the center of Harare but faces marginal competition from 'emergency taxis', (7-seater station wagons plying regular routes) and informal minibuses, (larger vehicles, which, whilst not formally approved, are allowed to operate illegally).

The emergency taxis were introduced at a time when the previous owners of ZUPCO failed to maintain service.[6] ZUPCO has attempted to protect its business on routes favored by emergency taxis by operating 33-seat minibuses at competitive fares. This has not succeeded in driving the emergency taxis out of business, but it certainly limits their growth by limiting the premium fares they can charge. These main-buses are marginally profitable to ZUPCO, (although not as profitable as if the passenger could be carried on ZUPCO's regular large bus services).

The major demand factor in Harare is the intensive peak journey-to-work travel. An earlier failed experiment at staggering hours, and passengers' preparedness to either pay a premium fare on emergency taxis or in minibuses or to endure considerable wait times for ordinary bus capacity, shows that preferences for the short, overcrowded peak travel are not likely to change. Off-peak discounts from present fares are unlikely to move significant travel away from the peaks. Because there are no published timetables, off-peak passengers arrive at stops at random times and are prepared to use an emergency taxi or mini-bus at premium fare rather than wait an unknown period for the less expensive ZUPCO bus. This intense peak requires 60 percent more buses than can economically be used in the off-peak, and the crucial peak service's economics depend upon maximizing revenue from the limited number of off-peak buses. If other operators are present with mini-buses, emergency taxis, or even large buses, they will expect to run all day, leaving the large operator (at present: ZUPCO) to take even more of its buses off the road between the peaks and worsening its financial performance.

Emergency taxis and mini-bus operations are concentrated in the shorter routes, leaving ZUPCO to run the routes to neighboring townships. Their fares are only between 40 percent (up to 5 km) and 30 percent (up to 20 km) greater than the standard ZUPCO fares. Emergency taxis do not run the longer routes with the greater peakiness in weekday demand.

Because there is a demand for only about 60 percent of the present Harare bus fleet in the off-peak, each large bus in off-peak service must earn around Z$370 to cover the cost of the buses idled, the same as the maximum a minibus must earn. At average fares, therefore, the large buses remaining in off-peak service must carry about 370 full fare passengers, but a mini-bus at the premium fare needs only about 250 off-peak passengers to break even. Whilst that suggests, superficially, that the minibus is to be preferred, its peak capacity is so inferior that no fleet of minibuses could economically (i.e., at equivalent cost) lift the peak loads in Harare, quite apart from the traffic congestion they would cause. For example, to replace the 716 large buses operated by ZUPCO would require about 1800 additional minibuses and an additional 1200 drivers. The minibuses would not be economical on the longer routes, and passengers would refuse to pay a Z$3 or higher fare each way for the journey to work compared with the present Z$1.50 each way.

To show another aspect of the problem, even if an all-minibus service was feasible for the longer routes, and passengers would pay the required fares, only 480 would be required in the off-peak, so there would be about 1,300 surplus minibuses scrambling for work in that period. As in Santiago, the fare structure that would maintain peak services under these conditions would be considerably higher than the present regulated ZUPCO fares.

2.2 Possible Directions of Increased Competition

(i) More minibuses without control of their routes

However much it may be desired by those on the routes on which minibuses and emergency taxis are prepared to operate, the introduction of more minibuses, operated by ZUPCO or others, will eventually cause a disproportionate reduction in the quality of service available to passengers on the longer routes who pay the standard fares. ZUPCO's revenues are already suffering from the competition of informal rivals and its own mini-buses used to control the emergency taxi numbers, but the fact that paratransit users are prepared to pay premium fares to use them shows that there is a market for premium service on some routes.

Any significant further shift to minibus operation will cause a loss of welfare to low income riders, both by having to pay higher fares and by the resultant reduction in availability of large bus service for peak trips on the longer routes.

(ii) More minibuses, limited to low density routes

Even if it could be arranged and administered satisfactorily, such routes may not have sufficient traffic to support both large bus and minibus service. So, if minibuses supplant large buses, the higher fares would apply to all passengers. Also, it would be difficult to keep the nominated minibuses from intruding on main routes to lift their revenues.

(iii) Improved minibuses at higher fares

This segmentation of the market would lessen the likelihood of ZUPCO's standard fare large buses losing so much traffic that their own service declined, but it would be feasible only if the unlicensed emergency taxis were to be eliminated from the market. If they could still operate, they would lift their fares toward the premium mini-bus fare, thus encouraging even more emergency taxis to operate.[7] By their owner-driven nature, they would be likely to offer a highly discriminatory fare structure to maximize revenues (with the high mini-bus fares attracting them into the market) but be prepared to operate down to bus fares to achieve their required total revenue in slack periods.

(iv) Mixed premium and standard fare operation of ZUPCO minibuses

A competitive alternative for ZUPCO would be to operate its minibuses on selected routes at premium fares in peak periods but to use them as normal buses, (either in place of large buses, or on additional trips) at large-bus fares in off-peak periods. This would put pressure on informal operators to avoid routes where ZUPCO faced the largest potential revenue loss. Informal operators would thus be isolated to those routes and times where their operations actually helped ZUPCO by handling some of the peak demand and saving ZUPCO some costs.

(v) New large-bus competitors on ZUPCO's routes

This has the apparent benefit of either lowering fares on high density routes or improving service on them, both of which should be attractive to low-income riders who have no alternative transport. ZUPCO clearly has some routes that would be attractive to any new operator. Although new entrants would be harder to find for the lower density routes and without cross-subsidy, they may revert to minibus routes at higher fares. This alternative will not be available if there is concurrently the possibility of additional minibuses entering the market, because new entrants will not risk the capital for large buses if they have to compete

with minibuses for off-peak business, and (ii) new entrants will prefer to enter the market with minibuses, requiring much less capital and maintenance facilities.

(vi) Competition for large bus routes

Under the terms of ZUPCO's franchise, this cannot occur until 1999, when Harare's transport regulators can invite tenders for the operation of any route. Tenders could be in the form of either fares or service (frequency or vehicle type) and could be called for high density (profitable) or low density (unprofitable) routes. Bids by individual operators for low density routes would need to be on a higher fare basis than applied to ZUPCO at the end of its franchise. Unless bids for the high density routes were to be called in optimal combinations for through-routing and scheduling purposes, these may not offer an advantage over the standard fares and buses already applying.

Calling for bids to operate at the existing fares will not necessarily produce a range of bidders beside ZUPCO, because the incumbent operator will already be providing the profit-maximizing combination of schedules with partly depreciated buses and its existing depots and would have lower costs than any new entrant able to shift the peak loads.

But at the end of the franchise, and with all of the uncertainties that entails, it is possible that ZUPCO would bid for only a portion of the routes and would seek to sell surplus buses and depots to other bidders. Thus in calling for bids for separate routes, the government might jeopardize the existing pattern of services.

2.3 Summary on competition in Harare

Whilst the operation of the informal emergency taxis adversely affects ZUPCO's revenues, they never-the-less fulfill a public need through their more frequent operation on the routes they find profitable. The fares charged by emergency taxis and minibuses, whilst about 50 percent higher than the fares on ZUPCO's large buses, are considered to represent value for money by a significant proportion of Harare inner-area public transport users.

An attempt to enforce ZUPCO's exclusive franchise, now that there are a large number of emergency taxis available, would just temporarily divert them to seeking approval for routes not presently operated by ZUPCO but carrying passengers between points served by a combination of ZUPCO services. Even if this division of services could be maintained, the effect on ZUPCO's revenues would be broadly similar to the present revenue loss, albeit at higher cost to the emergency taxi operators.

The Zimbabwe Government is faced with the dilemma of simultaneously

* protecting the franchise of the operator of the low-fare large buses on regular routes, which are mainly used by lower-income people, and ....

* maintaining public access to what is obviously a needed supplementary service .....

* without allowing both the existing buses and the licensed taxi service to be swamped by irregular operations.

The informal taxis compete with both ZUPCO's buses and the licensed taxis. Taxi-owners pay about Z$3,000 as a market price for their licenses and observe the laid down rules on vehicle standards, meters, and fares. ZUPCO, in return for its monopoly franchise of stage carriage services in the defined area,

operates all needed trips whether or not profitable loads are offering. Note that the considerations of protecting the large bus operation are independent of whether it continues to be run by ZUPCO or by other franchisees, which may occur after 1999.

As long as the emergency taxis are limited to the (often overloaded) seven passenger station-wagon vehicles, their limited earning power at the fares charged means that the number that can profitably be operated will be severely limited. It also means, over time, that owners of emergency taxis cannot generate sufficient cash to finance vehicle replacements, and the fleet is suffering serious deterioration in safety and passenger comfort. But if ZUPCO were to completely replace its large buses on any low-density route with its own minibuses, it would deny low-income passengers access to the standard fares as available on other routes. By the nature of the emergency taxi services, ZUPCO could not economically provide the total service offered by these unlicensed vehicles.

2.4 Some options for solutions

The application of hindsight will help in evaluating potential solutions for Harare. The 'problem' for ZUPCO — the competition from emergency taxis — has, of course, been a desirable solution:

* in relieving the effects of bus shortages due to fare levels failing to provide sufficient resources for replacements

* for those shorter distance Harare travellers, who prefer the higher standard service.

There is some cross-subsidy of ZUPCO's longer routes to the distant townships, routes for which there is a strong social case for the provision of low-cost journey-to-work transport. At the times of bus shortage, the obvious (with hindsight) solution of calling for bids to run some of the services, which ZUPCO was failing to service adequately, would have raised many important questions. If a bidder had come forward at lower than existing fares, it would have called into question the whole issue of an exclusive franchise based on cross-subsidy but with inadequate approval of fares increases. If no viable bidder emerged, the inadequacy of the fares would have been confirmed. Avoiding this consideration at that time did not eliminate the need, ultimately, to confront it. The franchise expires in 1999, and the Zimbabwe government will need to

administer the relationship in a way that maintains service while the franchise runs down, including maintaining a viable fleet

evolve a new regime for the post franchise period, including formal recognition of the emergency taxi industry but which gives ZUPCO an opportunity to survive in a contestable environment, regardless of its ownership.

The one certainty is that, if emergency taxi competition is allowed to persist, ZUPCO will not be able to support its present range of low-cost unsubsidised services, and this will put pressure on the longer routes with the greater peakiness and costly taper in the fares. The most effective way to proceed will be to invite ZUPCO to propose a rationalization of its services before the end of the franchise period, allowing the government to see the economics of each route, the operational inter-relationships, and how profits on one route interact with operations elsewhere. ZUPCO should be invited to propose routes that it would give up if explicit subsidies were not available, and those routes should be advertised for tendering. ZUPCO and others would bid for the right to run the routes concerned, stating a subsidy requirement, and then would choose the best offer. This way, contestability would be introduced to Harare bus operations.

The cost to the Zimbabwean government might be that cross-subsidy by passengers would be replaced by direct government subsidies, as in South Africa. But that would be an enduring solution, because ZUPCO's ability to cross-subsidize is being continually eroded by the competition from emergency taxis and its own minibuses (which are themselves a measure of protection against emergency taxis competition).

Of course, if a much more efficient operator than ZUPCO should bid, able to handle the pronounced peakiness of the long distance travel, subsidy my not be needed, and the route should be transferred. This may be a possibility for an operator who could find payable inter-town work for the buses in the seven hours between the two peaks.

3 Contracting Bus Operations within a Unified System: The Delhi Example[8]

3.1 Introduction

Delhi has made a change that will have the effect, often sought in theoretical analyses, of letting loose a large number of single-owner buses to compete on an established operator's routes but under an imposed maximum fare. The evolution of this policy sheds interesting light on the problems of establishing competitive supply in bus services.

In Delhi, the government-owned Delhi Transport Corporation (DTC) provides service at frequencies ranging from nearly 200 buses per weekday peak hour on the busiest routes, down to two per hour on lightly loaded outer routes. On most routes, DTC provides weekday service between the hours of 4 am and 12.30 am.

3.2 Issue of additional permits

For many years, New Delhi bus fares have been among the lowest in India, but DTC has not operated profitably and has been unable to obtain the full amount of Central Government funds for necessary bus replacements and to provide the buses needed for new services as Delhi grows. To meet this problem, in 1992 DTC advised the State Transport Authority (STA), the regulatory body, that it had identified 209 new routes it proposed should be operated by private owners on the basis that they would observe the approved fares for the New Delhi area, and that a large number of private owner buses could be accommodated to share the service on DTC routes on the same basis.

Accordingly, STA called for bids from present and potential private owners and received over 10, 000 applications. These were to operate new buses to the same specification as the DTC buses with preferences stated for up to five routes. The permits to be granted are for five years, with an initial four month probationary period. These applicants were reduced to 3,000 by ballot, and those 3,000 were then allocated routes by further ballot according to their route preferences. The first 1,000 buses entered service from January 1993.

A significant administrative issue arose with this rapid growth in the use of private owner buses on DTC routes in their management and the respective roles of the DTC inspectorial and STA enforcement staffs. It was the STA's intention that its own staff would supervise the operation of the 3,000 additional buses, and this required a whole new staff of roadside inspectors. But most of the new private owner buses are operating on DTC routes, intermixed with the corporation's own buses on what would, hopefully, be complimentary schedules.

The differences in the respective crews' incentives[9] to maximize revenue naturally lead to holding back

(deliberately running late in areas where passengers pay high fares to share in the passengers who would catch the following bus), and racing and skipping stops, either to get ahead of a DTC bus or in inner areas, where fares paid are low and there is a benefit to the crew in reaching the terminus early for an early start on the return trip.

3.3 Likely results of the present changes

With the introduction of widespread private operation and the extension of the superior service, premium fare system on both DTC and private owners' systems, New Delhi has a unique and comprehensive multi-standard bus system. It ranges from **DTC standard services**, available at the lowest fares with all the government-dictated discounts and with student concessions available, and therefore, generally more crowded than the private services on the same routes to **Private standard services**, on which no concessions from the standard fare will be available, and premium services of both types.

The commercial problem for DTC with this hierarchy of services is that, along with its inevitably higher costs due to use of union labor and strict observance of the provisions of the Motor Transport Workers Act 1961, it is locked into the lowest yielding market for revenue. At the same time, the private buses profit under the fares umbrella provided by DTC's greater need for high fares than their own costs would justify. This enhanced profitability of private buses on DTC routes leads to pressure by the private owners to increase the number of vehicles they operate, further diverting DTC's full-fare market and condemning it to be the residual carrier of students and other concessional-fare riders. If the Government is unwilling to reduce concessions, the preferable way to stabilize this situation would be to force the private buses to carry all concessional-fare passengers at the fares decided by the government and to absorb the lower revenue yield.

Delhi is gaining the benefits of low-cost private buses under relatively free entry conditions, but is not yet solving the problems created by leaving the public sector with the highest costs and the lowest yielding traffics. In particular, the public sector would be saddled with the costs of administering services over the whole of its routes on (potentially) about 50 percent of its former revenue., while the State Transport regulator faces the cost of building up an almost equivalent administrative structure.

4 Summarizing .....

Each of these examples is of a system where the government is attempting to have the advantages of a formally organized, schedule service bus network available to low-fare riders (including students and other concession riders in Delhi) whilst providing other riders with the benefits of high frequencies and less heavily loaded vehicles.

In each case, the successful maintenance of the dual system, with the implicit guarantee of all-day service from the primary operator, depends upon either strict control of the competitors' output or subsidy for the primary operator. In Harare, more deliberate government decisions will be needed as bus replacements are required approaching the end of the franchise period when ZUPCO (or any competitor) will require a more certain future before committing resources to maintaining the present low fares on the longer routes.

In Delhi, the cost advantage of single-owner private buses over the unionized DTC buses will prove increasingly attractive and will probably result in a decision not to replace the DTC fleet as it ages and the progressive dismantling of the Corporation. But the wide range of traffic densities on Delhi routes means that, to maintain present service reliability, strict regulation will be required to prevent private buses concentrating on the better routes and the more profitable times. The issue to be resolved is the amount

and cost of supervisory activity required to maintain the over-all quality of service as private buses progressively replace DTC's own buses. The least cost solution, both for the changeover period and long run, would probably be to contract the supervision of Delhi bus operations to the DTC. The worst-case outcome would be for the Delhi STA to build a parallel supervisory organization.

In both cases, the establishment of contestability has brought significant user-benefits but only at the risk of diminution of service for particular user groups. Meeting the goal of maintaining service for all present users will require the re-imposition of some regulatory structures. An issue yet to be addressed in each city is whether this detailed management of bus operating standards can best be supplied by those also charged with management of the major bus operations or by government employees in a less profit-accountable agency. Private bus operators would obviously prefer the government agency for its implicit transparency and 'fairness'; a judgement will have to be made in trading off some measure of these goals against the greater effectiveness of using experienced bus operating organizations. This problem is not unique to these cities; London is about to embark on a similar course in substituting a new agency for the management formerly provided by London Buses Limited for its subsidiaries.

End Notes

1. See "Box 9, Hong Kong's Wide Range of Bus Services" in Urban Transport, World Bank, 1986, p26.

2. See "Box 10, Route Associations", ibid, p27.

3. The Santiago case is described in Darbera, R., "Deregulation of Urban Transport in Chile, what have we learned?", The World Bank.

4. The analysis in this section was made originally on a World Bank mission. It has been confirmed by use of the data collection for present bus operations of David Maunder, of the Transport and Road Research laboratory, who kindly made available through the Government of Zimbabwe his exhaustive working papers on bus operations in Harare, prepared whilst on secondment to the Zimbabwe Ministry of Local Government. Dr Maunder, of course, bears no responsibility for the present analysis.

5. This company, now owned jointly by the Zimbabwe Government and the United Transport Group, was formerly a wholly-owned United Transport subsidiary. The change in ownership, and the greater certainty this has imparted to ZUPCO's planning, has resulted in an improved quality of service.

6. For some years the fare-setting authority in Harare approved fare increases inadequate to both maintain service and to provide the agreed 20 percent return on capital invested in the exclusive franchise private bus operator (ZUPCO). At the same time, devaluation of the Zimbabwe Dollar meant that replacement imported buses became prohibitively expensive. The result was the retention in peak service of obsolete and unreliable buses, and the effect in the afternoon peak period was that the weighted average waiting time for space on a bus was 37 minutes, with a maximum individual waiting time of four hours. The breakdown rate peaked in 1987/88 at 3.5 per 10 000 km. Purchase by the government of a 51 percent interest in ZUPCO, and a subsequent government **policy of granting fares increases requested by the company, have restored the financial basis of the company and its ability to borrow to replace buses, and the average peak wait-times have declined to 23 minutes (maximum two hours).**

7. ZUPCO limits the incursion of unlicensed emergency taxis in its franchised routes by operating a break-even service of its own minibuses, at fares 50 % greater than for the less frequent large buses.

8. This section relies heavily on discussions with Mr P Datta, Assistant General manager, DTC.

9. As in most other cities with individual private bus operations, the Delhi private bus 'wage' basis is really a negative wage form, in which crews are expected to make a minimum pay-in; they are effectively hiring the bus each day, and living off fare revenue in excess of the hire and fuel cost.