FIGURE 4.20
CUMULATIVE VEHICLE TRIPS AND VEHICLE KM. BY AVERAGE SPEED – ORDINARY BUS

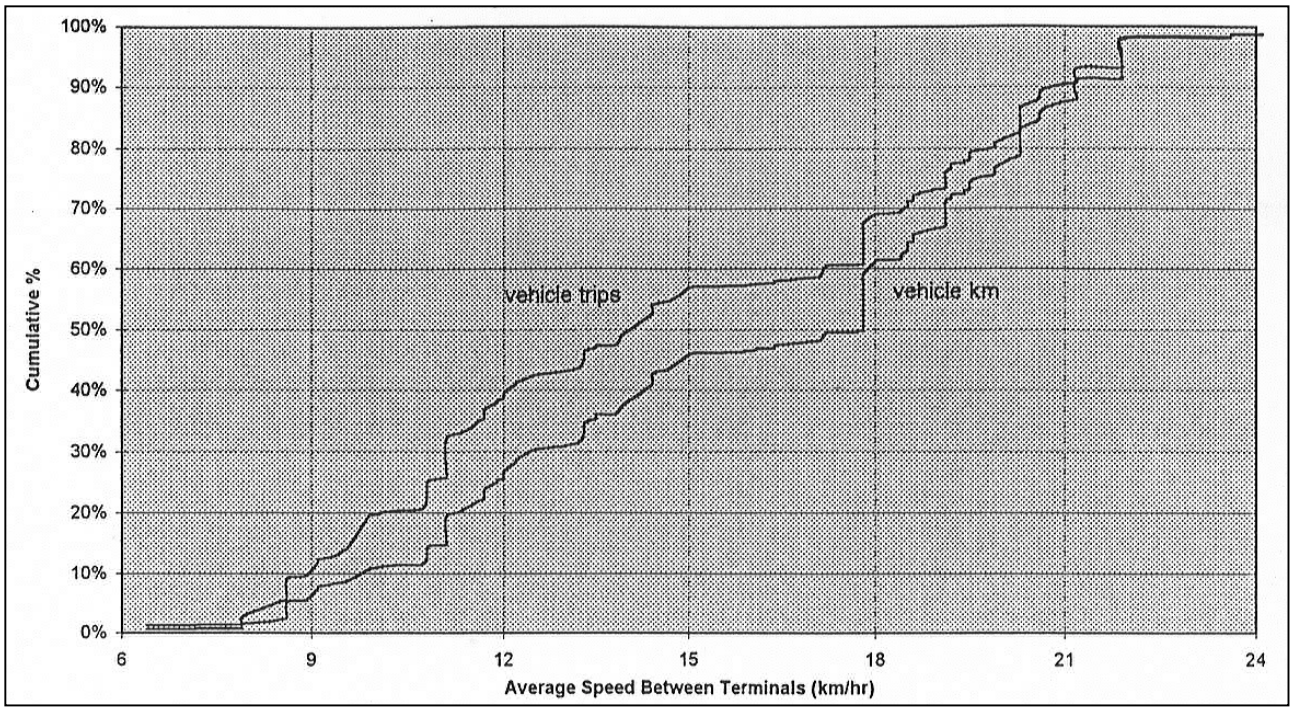


FIGURE 4.21
CUMULATIVE PERSON TRIPS AND PASSENGER KM. BY AVERAGE SPEED – ORDINARY BUS

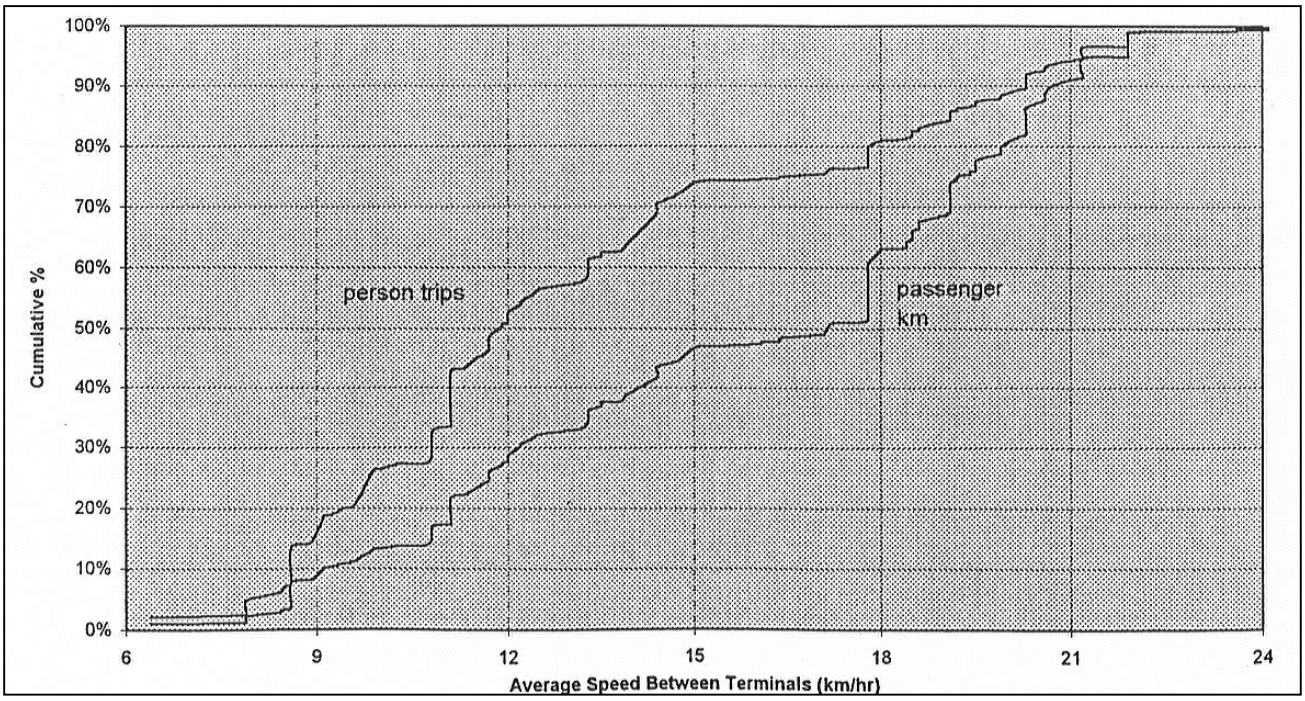


FIGURE 4.22
CUMULATIVE VEHICLE TRIPS AND VEHICLE KM. BY AVERAGE SPEED – AC BUS

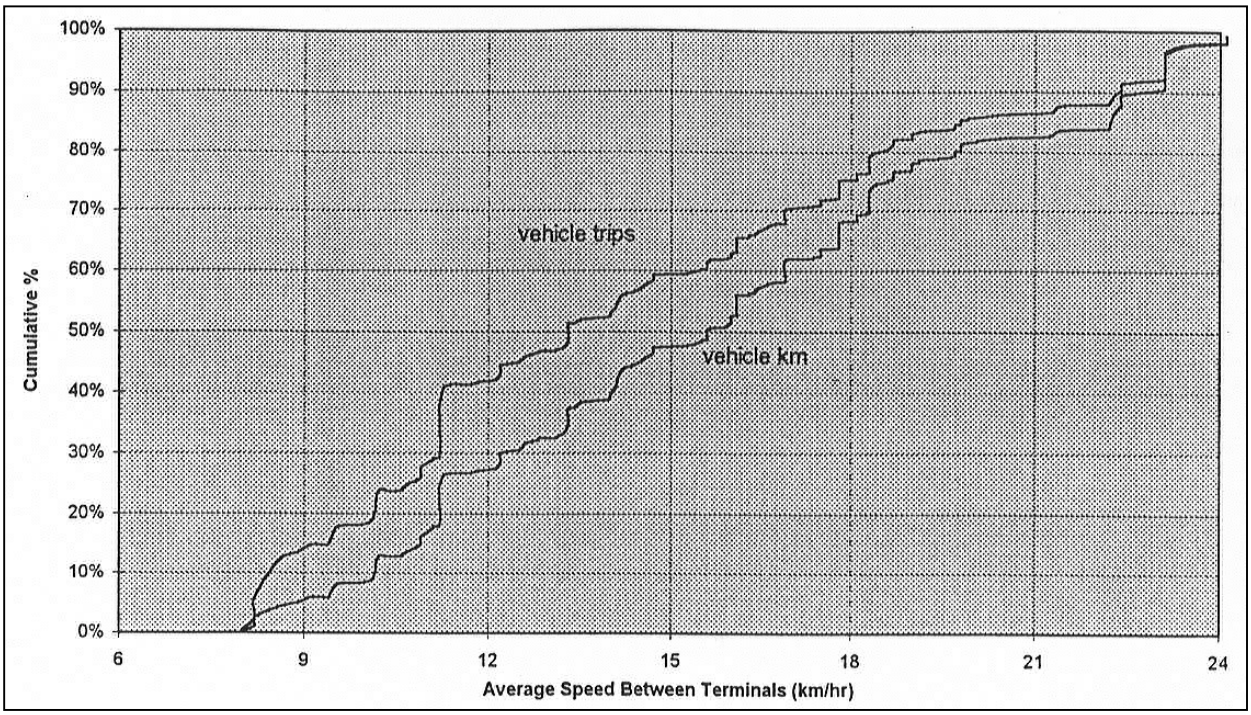
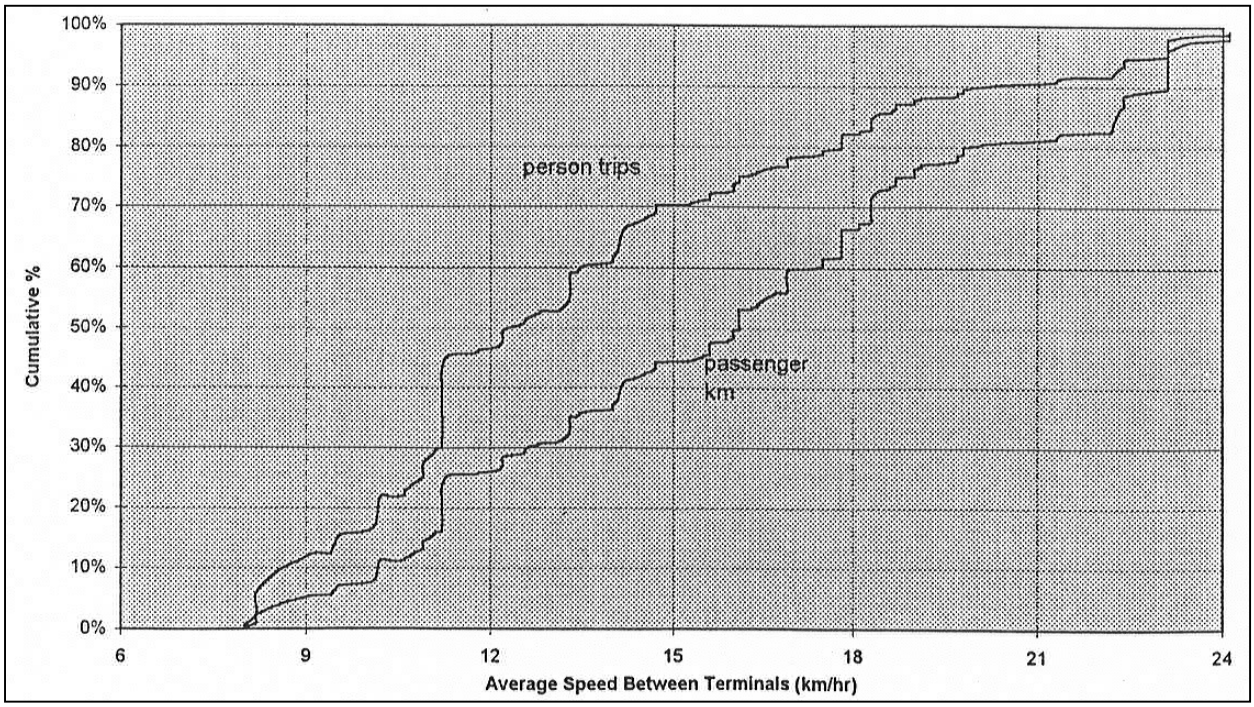


FIGURE 4.23
CUMULATIVE PERSON TRIPS AND PASSENGER KM. BY AVERAGE SPEED – AC BUS



All charts feature step-jumps at particular speeds, e.g., jeepney at 21.2 km./hr. or Ordinary Bus at 17.5 km./hr.. These arise when several services operate almost identical routes along the same corridor and have almost identical speeds. Notable features of these charts include the following:

Jeepney (Figures 4.18 and 4.19)

- While there are jeepney routes operating at very low average speeds, they account for a very small part of the transport market – less than 8% of vehicle and person trips (and only 3% of vehicle and person km.) are on routes with an average speed of less than 6 km./hr.;

- However, 51% of trips and 37% of km.. are at speeds of 9 km./hr. or less – estimated as the 'break-even" speed for longer trips at a 100% load factor;

- Only 10% of vehicle trips, 8% of person trips and 16% of km. are at speeds of 20 km./hr. or above – estimated as the "break-even" speed for longer trips at a 75% load factor;

- The cumulative percentage of vehicle km. and passenger km. are almost identical at all speeds, suggesting that load factors are similar over the whole range of jeepney operating conditions;

Ordinary Bus (Figures 4.20 and 4.12)

- Again, while there are ordinary bus operations at low speeds, they account for a very small part of the market – only 3% of vehicle trips, 1% of vehicle km., 5% of person trips and 2% of passenger km. are on routes with an average speed below 8.4 km./hr.;

- The difference between operations assumed to be "City" and "Provincial" is clearly marked, activity being concentrated on routes operating at below 15 km./hr. (City) or above 17.8 km./hr. (Provincial) – those routes with average speeds between these two points account for only 4% of vehicle km.. and 5% of passenger km.;

- There is (as indicated in Figure 4.16) a big difference in trip length between the two types of operation – there is also a difference in the number of people carried per vehicle trip, while the slower routes operate 57% of vehicle trips, they carry 74% of person trips;

- But, as with jeepney, the percentage of vehicle and passenger km. performed at each speed is very similar (e.g., 46% of vehicle km. and 47% of passenger km. by 15 km./hr.), i.e., load factor is similar for both City and Provincial operation – thus, City operation is typified by more than one passenger occupying a seat during a vehicle trip, whereas on Provincial operation it is more likely that only one passenger will occupy a seat throughout the vehicle trip;

- Only one route was recorded as having an average speed too low for viability at 100% load factor with a New Bus (and this may only have been a temporary feature of the route, e.g., roadworks), while 50% of all Ordinary bus activity (vehicle km.. and passenger km.) was at speeds above 17.5 km./hr.. the break-even point for a New Bus at 75% load factor;

- Only four routes, accounting for only 2% of activity, ran at speeds too low for viability at 75% load factor with a Reconditioned Bus, while Figure 4.14 indicates that a 60% load factor or less would be adequate for profitable operations with a second-hand vehicle for 50% of activity (mainly Provincial operation) that is at speeds of above 17.5 km./hr.

AC Bus (Figures 4.22 and 4.23)

- AC bus operations do not display the same speed-break as ordinary bus, activity being more evenly spread over the range of speeds observed (the leap in activity at 11.2 km./hr. is almost entirely accounted for by two routes from central Manila to Moonwalk via Coastal Road which between them operate 8.6% of all AC vehicle trips and carry 11.2% of all AC person trips in the database);

- There is also a less marked difference in average trip length by speed – while, as with other vehicle types, the percentage of vehicle km. and passenger km. at each speed are similar (i.e., similar load factors for routes averaging different speeds), 59% of vehicle trips operating at or below 15 km./hr. carry only 70% of person trips.

From this more detailed analysis of observed operations, it would appear that most routes have the potential for financial viability provided passenger loading, over the whole route and operating day, is high enough. Before examining the viability of the surveyed services on a route-by-route basis, however, a more detailed analysis of the current tariff structure is presented, with particular relevance to the financial viability of jeepney services.

Jeepney Fares

Figure 4.24 shows the current authorized tariff structure for Metro Manila jeepney operations, expressed as average fare per km. for trips of different lengths. The October 1997 revision, which increased the boarding charge (for the first 4 km.) from ₱2 to ₱2.5, raised fare/km. at 4 km. significantly (31%) above the marginal rate (₱0.475/km.) for the first time – it has traditionally been lower than the marginal rate. This means that fare/km., even for longer trip lengths, exceeds the marginal rate assumed in the theoretical discussion of Section 3, being around ₱0.52 for a 10 km. trip. There are further comments on tariff structure in Section 6 below.

This is of particular importance to the financial viability of jeepney operations. Figure 4.25 repeats Figure 4.12, but with marginal revenue set at ₱0.52 per passenger km. It indicates enhanced financial viability with the post-October 1997 tariff structure. Further, as indicated in Figure 4.15, the average trip length on the great majority of jeepney routes included in the MMUTIS database is short – less than 4 km.

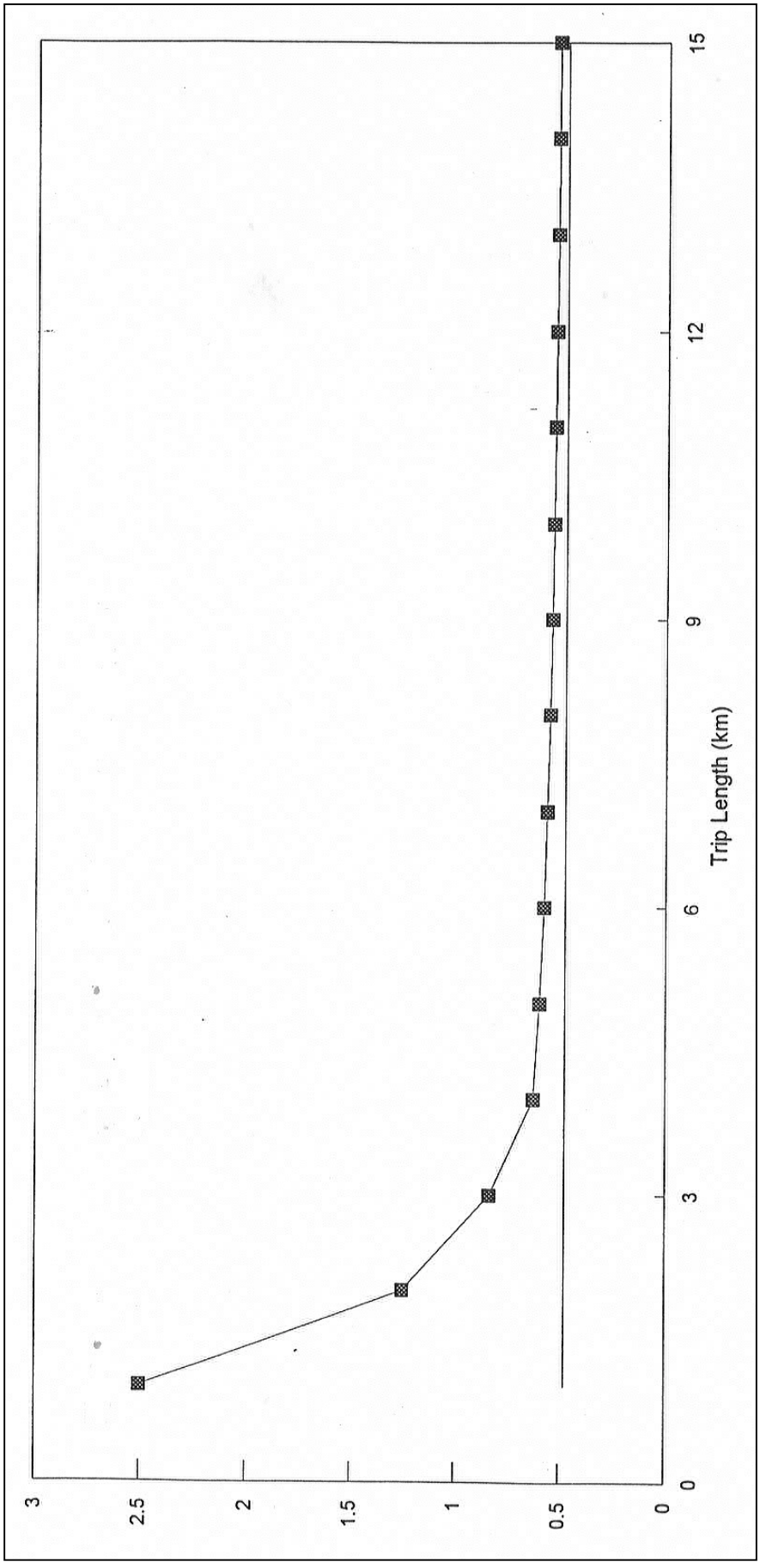


FIGURE 4.24
FARE PER KM. FOR DIFFERENT TRIP LENGTHS, JEEPNEY

FIGURE 4.25
RELATIONSHIP BETWEEN AVERAGE SPEED, LOAD FACTOR AND FINANCIAL VIABILITY OF JEEPNEY – REVENUE ₱0.52 PER PASSENGER KM.

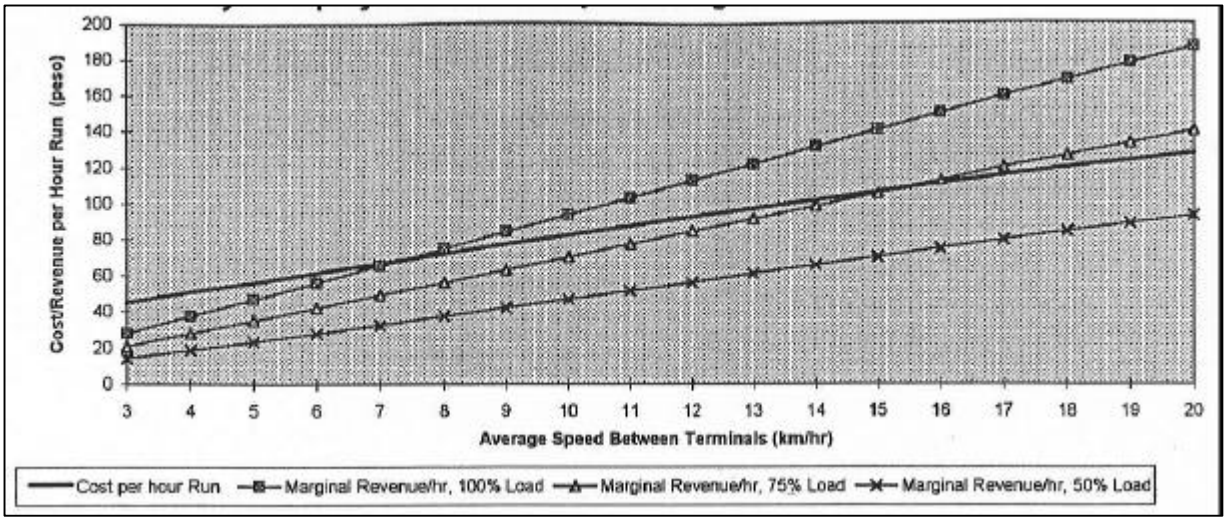


FIGURE 4.26
RELATIONSHIP BETWEEN AVERAGE SPEED, LOAD FACTOR AND FINANCIAL VIABILITY OF JEEPNEY – REVENUE ₱0.63 PER PASSENGER KM.

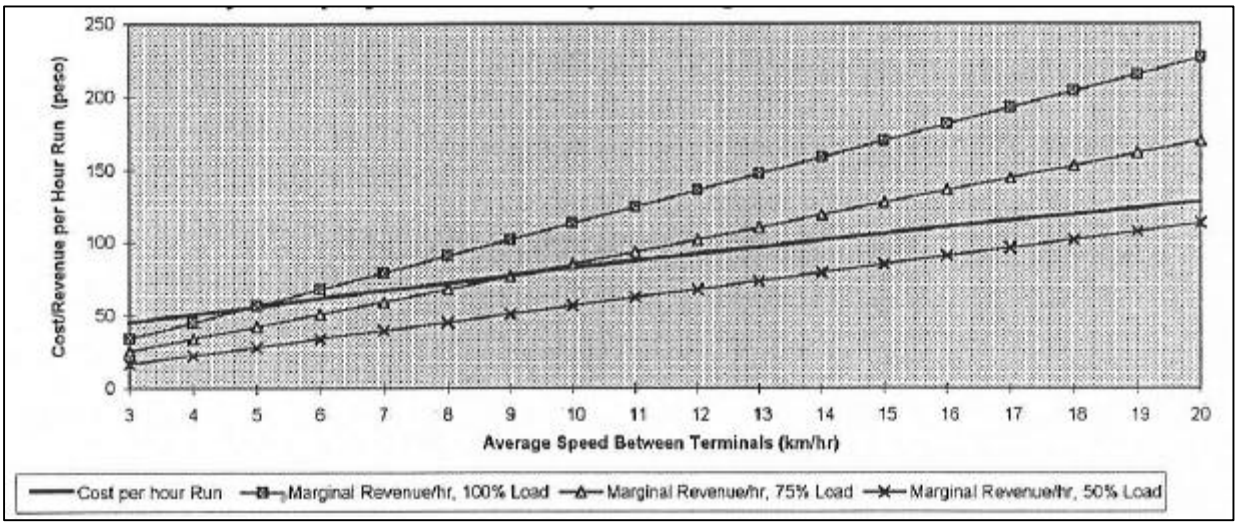
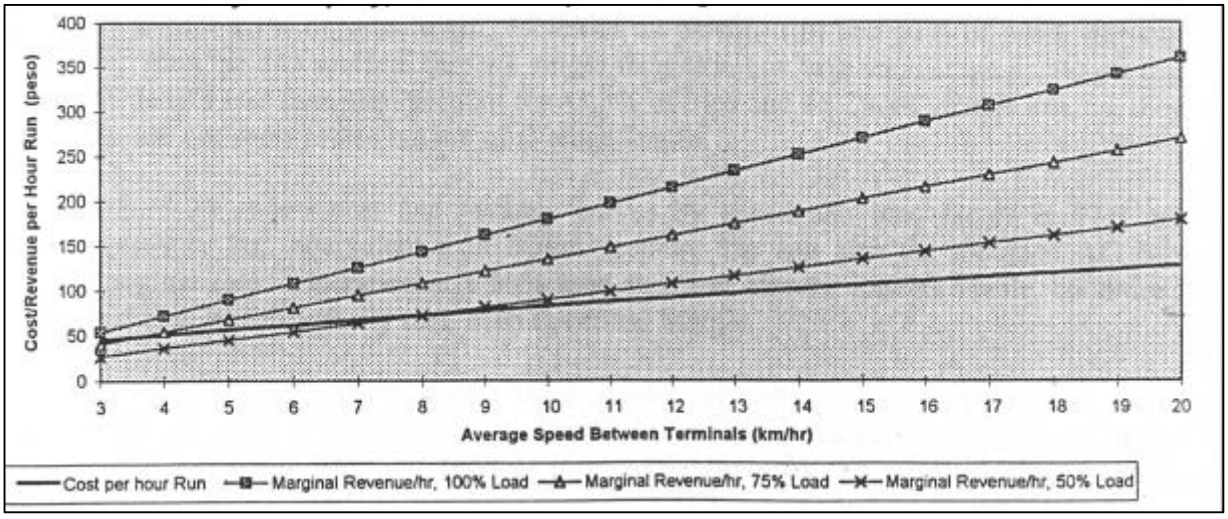


FIGURE 4.27
RELATIONSHIP BETWEEN AVERAGE SPEED, LOAD FACTOR AND FINANCIAL VIABILITY OF JEEPNEY – REVENUE ₱1.00 PER PASSENGER KM.



However, as noted, each data point in this figure represents a route, and gives no indication of the level of activity on that route. Further analysis of the MMUTIS Jeepney operations database shows that:

- 7 jeepney routes had a load factor of more than 100% accounting for only 2% of vehicle trips and 2.1% of vehicle km., but 3.4% of person trips and 4.1% of passenger km., but

- only 54 jeepney routes (including the above 7) ran with a load factor of more than the 75% required for break-even on longer trips, these routes accounted for 11.3% of vehicle trips and 17.4% of vehicle km. (i.e., they were among the longer jeepney routes), 14% of person trips and 24.2% of passenger km. (i.e., passenger trip length was also above average).

This means that over 90% of surveyed jeepney routes, and 82.6% of jeepney vehicle km. are operating at load factors too low for financial viability at the marginal tariff under urban tariff conditions. While the average tariff of ₱0.52/km for longer trips identified above reduces the break-even speed at 75% load factor to 15 km/hr., this is still much faster than what the average jeepney achieves.

However:

- 149 routes (26% of the database) are less than 4 km. long, meaning that revenue per passenger km. will be better than ₱0.63/km., a level at which financial viability at 75% load factor is achieved at 9 km./hr. Figure 4.26 presents cost and revenue curves by speed and load factor at this average fare. These routes account for 31.6% of vehicle trips but only 9.9% of vehicle km., i.e., they are much shorter than the average route, and similarly account for 21.7% of person trips, and 8.6% of passenger km. trip length is also much shorter than the average;

- on 244 more routes, the average trip length passengers choose to ride is less than 4 km. – i.e., on a total of 393 routes, 69% of the database, revenue per passenger km. exceeds ₱0.63/km – these services account for 74.9% of vehicle trips, 55.1% of vehicle km., 74.7% of all person trips, and 51% of passenger km. Thus, the 244 services that are longer than 4 km. but have an average passenger trip length less than 4 km., account for 43.3% of trips and 45.2% of vehicle km. They are not short routes but are of average length.

Figure 4.27 shows cost and revenue curves by speed and load factor at ₱1.00 per passenger km. equivalent to a 2.5 km. jeepney trip and also the assumed AC bus marginal fare. Operation at a 50% load factor at 8 km./hr. appears viable, conditions that may be fairly easily met, even in central Manila.

Thus, the overall picture is of a large number of routes on which passengers pay a relatively high (by Philippine standards–these fares are among the lowest in the world for public transport services provided entirely by the private sector) fare/km. either by choice or because the route is short, and a small number of longer routes which achieve viability at the marginal authorized tariff rate by achieving high load factors.

Route-by-Route-Analysis

The foregoing analysis has identified at least four modes of public transport operation being practiced in Manila which offer prospects of financial viability:

- AC bus operation, even with a new (full cost) vehicle;
- Ordinary bus operation on provincial (high speed) routes;
- Ordinary bus operation on city (low speed) routes, with a reconditioned vehicle; and
- Jeepney operations on routes where the average trip length is short.

Sufficient information has been recorded for most of the routes in the MMUTIS routes database to permit comparison for each surveyed route of:

- Revenue per vehicle trip, computed as the fare for the average trip length factored by the average number of passenger per trip, and

- Cost per vehicle trip, estimated from cost per vehicle km. (from Tables 4.3 to 4.5) at the average speed of the route, factored by the route length.

To test for a revenue surplus or deficiency, new bus costs were compared with AC bus revenues, and reconditioned bus costs were compared with ordinary bus revenues.

Following are the results of this analysis, although they need to be treated with caution:

- Revenue may well be higher than calculated – an average trip length of 6 km. implies revenue of around ₱3.50 per passenger, but if it rose due to a 50:50 mix of 1 km. (revenue ₱2.50) and 11 km. (revenue ₱6.00) passengers, the actual average revenue is ₱4.25. Furthermore, the load factors in the database are derived from survey observation of only a few vehicle trips on each route. While the extremely high load factors recorded on some jeepney routes may not overstate the all day levels by much, the low load factors recorded for others almost certainly understate the true carrying capacities of the service; and

- Costs (considered further below) will depend on the number of vehicles deployed on the route and the actual number of hours and km. operated by each, rather than the VOCM assumptions underlying the cost/km. estimate used, as well as on their type. While data on the number of vehicles assigned to individual routes is available from the bus and jeepney operators' surveys, it is not sufficiently comprehensive to be applied to the whole route database.

Nevertheless, at an aggregate level this analysis gives a good indication of the level of financial viability in Metro Manila bus and jeepney operations.

The main findings were:

- At an aggregate level, all types of operation were financially viable:

  ⇒ Jeepney costs were 87.25% of revenues;
  ⇒ Ordinary bus costs were 91.11% of revenues; and
  ⇒ AC bus costs were 55.64% of revenues.

- At the individual route level, a significant number of jeepneys (32% of the database) were non-viable on the basis of surveyed patronage and VOCM costs, some significantly so (cost = 230% of revenue). While the more extreme revenue deficiencies may result from surveying atypically lightly loaded vehicle trips, it is likely that routes are indeed not generating sufficient revenue to cover the full VOCM cost used in this analysis;

- Conversely, some jeepney routes appeared to have costs that were less than 40% of revenues. These results are less likely to have arisen as a result of trip sampling bias, but may understate the costs if the route is being operated by a greater number of vehicles than is strictly necessary (i.e., vehicle utilization is lower than assumed by VOCM);

- Overall, the jeepney services in the database appeared to be generating a surplus of P3.5m per day;

- A few ordinary bus routes (12.5% of the database) were non-viable on the basis of the surveyed patronage/revenue and VOCM costs, but only two of them are significantly so (costs of 160% and 195% of revenues, respectively). As these two routes were also recorded as low load factors, this result may be due to sampling bias;

- Most ordinary bus routes were marginally profitable, with costs between 75% and 100% of revenues. This result suggests that ordinary bus operation with a new bus would not, in practice, be financially viable;

- A few routes (10) had costs less than 70% of revenues (a level at which a new bus could be run profitably). All had high load factors and 8 were (slow) city routes;

- Overall, ordinary bus services generate a surplus of only P700,000 per day;

- As indicated above, AC operation, even with a new bus, is extremely profitable. All routes retained in the database[2] were profitable, most with cost between 50 and 60% of revenue; and

- On the basis of the analysis, AC bus generates a surplus of over P12m a day using new bus cost, and there are many reconditioned AC buses in operation, especially on city routes. For provincial routes, the estimate only includes vehicle km inside the Study Area.

Further analysis was undertaken to try to identify factors contributing to the profitability of the different types of operation. This is presented as Figures 4.28 to 4.36, nine scatter diagrams which plot profitability against load factor, passenger trip length, and average speed for the three main types of operation examined. The scale of the profitability axis is reversed, displaying cost as a percentage of revenue, i.e.,

[2] On one route, the load factor indicated patronage might have been under-recorded by a factor of 10. As this could not be confirmed, this route was excluded from the database.