



# The relationship between car ownership and public transport provision: a case study of Hong Kong

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Received 1 March 2001; revised 1 September 2001; accepted 1 September 2001

## Abstract

It is often suggested that traffic demand management measures designed to make public transport more attractive have little impact on car ownership and use. Much of the work on this subject, however, relates to piecemeal changes in public transport provision. Results of an attitudinal survey of 389 university students in Hong Kong, where public transport is both plentiful and cheap and car ownership and use is extremely low, indicate that good public transport can deter car ownership, with 65% of respondents stating that they are unlikely to buy a car in the next 5 years. © 2002 Elsevier Science Ltd. All rights reserved.

**Keywords:** Car ownership; Public transport provision; Hong Kong

## 1. Objective

The objective of this paper is to assess whether the provision of good, cheap public transport can discourage the purchase of, or desire to purchase, a car. In order to shed some light on this question, it uses the example of one particular city, Hong Kong, where GDP is high yet, as is shown later, public transport still dominates. It seeks to determine whether there are any lessons to be learned by countries which are endeavouring to reduce car ownership and use. The paper reports on the results of a survey designed to investigate the attitudes of young university students towards cars and public transport and to assess whether the existence of good public transport will be sufficient to stave off a future increase in car ownership.

Hong Kong has a long history of good, cheap public transport and it is possible that this fact in itself is important. It is not, nor has it ever been, the norm to own or drive a car. However, it is also possible that the existence of good public transport, per se, does deter people from buying a car.

## 2. Background

Methods of reducing car ownership and use, particularly

in cities, have been debated and tested in Europe and America for over three decades (see for example Plowden, 1972, 1980; Jones 1989; Mogridge, 1990; Pharoah, 1992) with the Buchanan Report (Ministry of Transport, 1963) being instrumental in initiating the debate in the UK. Efforts have intensified in the last decade as congestion and environmental problems have taken centre stage in the international arena. A consensus has been reached in most developed countries that building roads is not the solution to the problems of congestion and pollution caused by an ever increasing volume of traffic. One of the main alternative policies often suggested is to attract people away from their cars by improving public transport provision. Policies which have been advocated to encourage a modal switch from private to public transport include investment in bus services, park and ride schemes, LRT systems, guided busways and others.

Evidence, however, seems to suggest that such policies are not always successful. Although there have been successes [for instance in Manchester, the Manchester Metrolink LRT system claims that it has had great success by reducing car journeys in the Manchester area by 5 m per annum (Manchester Metrolink, 2001)], it has often been found that improving public transport will have at best, marginal influences on the use of cars.

Studies of rail schemes have often found that patronage was attracted more from other public transport modes than cars. Younes (1995), studied the impact of major improvements to public transport in three major European cities.

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The first was the Victoria underground line in London, about which he says:

“The inescapable conclusion is that the provision of the Victoria Line had only a marginal effect on relieving road traffic congestion. Its main impact was a redistribution of public transport patronage between other Underground lines and the bus services (p. 342).”

The same conclusion was reached in relation to the U-bahn in West Berlin and the S-bahn in Stuttgart. His overall conclusion was that there may be some reductions in private vehicle use, but that these are only temporary and marginal. In all three cases he found that the suppressed demand for road space was released and roads soon became as busy as before the improvements in public transport. Axhausen and Brandl (1999) found that in Karlsruhe, one line of the LRT attracted more car users and the other attracted more public transport users.

Heggie (1976) showed that overall, the scope for diverting car users to public transport services was small. Most new patronage came from existing bus users, new users and non-motorised transport users. In reviewing the outcome of schemes in several European cities, Marshall and Banister (2000) showed that in Bristol (UK), a new park and ride scheme had met with some, but only limited, success at bringing about a modal switch. Parkhurst (2000), after reviewing the evidence of eight park and ride schemes in the UK, concludes that “urban fringe bus-based park and ride provided with dedicated bus services is better described as a policy of car traffic redistribution than a policy of car traffic reduction”. Meyer (1999) shows that in the US, most transport control measures have met with only limited success. Following an analysis of the Dutch National Mobility Panel survey, Kitamura (1989) suggests that car use determines transit use rather than transit use determining car use. He concludes that

“observed changes in mode cannot be adequately explained by assuming that a change in transit use influences car use. The finding suggests that the increase in car use, which is a consequence of increasing car ownership, may not be suppressed by improving public transit” (p. 155).

Maat and Louw (1999) concluded that objectives of travel reduction measures were very rarely achieved. Wootton (1999) perhaps best summarises this view when he says

“sadly, while the need for adequate high quality public transport service is real, the popular belief that improved public transport services will satisfy people’s travel demand, persuade them out of their cars and solve the problem of congestion and pollution is false” (p. 161)

When people’s opinions and attitudes are sought as to whether they would use public transport more if it improved, there is definitely quite a high level of support. Cullinane (1992), in an attitude survey based on a sample of 2428 households in the UK, found that 41% of car users said they would reduce their car use if public transport services became frequent and reliable. In a similar survey by Gallup (1989), 41% of respondents said they would use public transport if it were fast, frequent and available even if it cost a good deal more than it does now. A survey by Lex (1995) found that 38% of respondents to their survey said that they would use their car less if public transport were better. This proportion increased to over 50% of respondents in London.

So why is there a difference between attitudes and action? It could be that opinions are not a good indicator of action or that respondents display a policy response bias. However, another possible explanation is that the type of improvements in public transport envisaged by the respondents of such surveys are of a much greater magnitude than those actually put into place (such as isolated park and ride schemes). Thus, it is not necessarily that attitudes are not good indicators of actions, but rather that care needs to be taken in the design of attitudinal surveys to ensure that the scenarios envisaged by the respondent are accurate reflections of the actual event to take place.

Where the overall provision of public transport is good and cheap, there is some evidence that the effects are larger. Studies undertaken of the policies in place in the Metropolitan cities of the UK in the 1970s, for instance, appeared to show that good, cheap public transport provision could reduce the growth in car ownership. For instance in South Yorkshire where fares were held constant between 1975 and 1986 (equivalent to cutting the fares by half), the fall in patronage was halted and began to reverse so that by 1981, patronage had increased by 7% compared to a decrease of 25% in other areas (Goodwin, 1986). There was also an initial slowing in the growth in the numbers of cars, followed in the early 1980s by a fall in car ownership and use (Stokes et al., 1991). However, most of these policies were prematurely cut short by the incoming Conservative government and so perhaps did not have sufficient time to fully influence patterns of car acquisition and use.

Bratzel (1999) describes some success stories in European cities where private car use has been reduced considerably. For instance Zurich and Basle achieved a rapid increase of public transport patronage of between 30 and 50% in the 1980s and Freiburg registered a growth in public transport patronage of 50%. Bratzel states that the car’s share of modal split in Zurich is only 28%, in Amsterdam it is 31% (work days), in Groningen it is 36% and in Freiburg it is 42%. These findings are supported by Pharoah and Apel (1995). However, such public transport patronage figures have been attained in cities where public transport *as a whole* has been improved considerably. It could be argued that many public transport improvement

policies in Europe have been too piecemeal—that introducing a park and ride scheme on its own is too small to have any effect on mode choice. It may be that public transport provision as a whole needs to reach a threshold level, above which it becomes more viable not to have a car. If public transport is comprehensive, frequent, integrated and cheap enough, then maybe this will encourage people to use it.

Part of the reason suggested as to why public transport can never re-emerge as the dominant mode of transport in the developed world, is the strong link between GDP and car ownership and use. GDP per capita is increasing in most developed nations and car ownership and per capita GDP are usually assumed to be closely linked. Indeed, GDP is usually a central variable in models used to forecast car ownership (Fowkes and Button, 1977; Button et al., 1982). A study of the period 1960–1992 by Dargay and Gately (1999) found that, across 26 countries of varying incomes, there has been a strong historical relationship between growth of per capita income and growth in car ownership. Thus, it is generally assumed that increasing levels of GDP will inevitably mean pressure to increase car ownership and use, although Newman and Kenworthy (2000) show that on a city level such a relationship does not necessarily exist. Does the pressure of increasing wealth lead inexorably to greater car ownership and use?

Despite its high GDP levels, it is often argued that the reason why Hong Kong has such low car dependency is because it is a large city with a very high urban density. In this case, the outcome of the survey in Hong Kong described in this paper will have little bearing on what could happen in the rest of the world. Pharoah and Apel (1995) note the strong relationship between city size and use of public transport. Kenworthy and Laube (1999) support this argument in their comparison of 46 cities. They conclude that the wealth of cities does not alone provide reliable or consistent evidence in explaining the degree of automobile dependence in different cities—urban form, particularly higher urban density has a greater effect.

Whilst there is undoubtedly a great deal of truth in this argument, cities with similar size, urban density and wealth to Hong Kong (such as Singapore and Tokyo), have higher car ownership and use figures. Singapore, for instance, has a population of 3.2 million, a GNP per capita that is 30% higher than Hong Kong and a population density of 5186/km<sup>2</sup> compared to 6755/km<sup>2</sup> in Hong Kong (UNDP, 1999), but despite controls on car ownership still has 120 cars/1000 population compared to Hong Kong's 48 (Hong Kong Transport Bureau, 2000). If we consider car use/capita, Hong Kong is also very low compared to Singapore and Tokyo, at 493 km/person/annum in Hong Kong, 2103 in Tokyo and 1864 in Singapore (Newman and Kenworthy, 2000). While the density argument may be important, it cannot be simply stated that car ownership and use is low *irrespective* of transport policy. That is to say, it is not the

case that just because the city is densely populated, public transport will automatically be good and people will automatically use it. London in the 1950s had a population of 8 million and relied almost exclusively on public transport, but public transport lost its dominance as cars became more popular worldwide.

Before looking at the results of the survey, it is useful to describe the transport system in Hong Kong in order to illustrate its scope and qualities.

### 3. Transport in Hong Kong

In 1999, the population of Hong Kong was 6.8 million. Despite a fairly high per capita GDP of HKD179,803<sup>1</sup> (Hong Kong Census and Statistics Department, 2000), comparable with the UK, car ownership and use is extremely low in Hong Kong, with around 90% of all vehicular trips being made by public transport (including taxis). Car ownership rates as well as public transport journeys are shown in Table 1. In 2000 (the latest figures available), vehicle ownership per thousand population was 76, with car ownership standing at 49. This compares to car ownership levels of 377 per thousand population in the UK, 120 in Singapore, 325 in Japan and 485 in the USA (Hong Kong Transport Bureau, 2000). This has not occurred as a result of restrictions on the purchase or use of cars as has been the case in some countries, such as Singapore, but has occurred naturally. Indeed, although fuel and parking prices are high, car prices are actually relatively low in Hong Kong.

The public transport system consists of a mixture of rail and road based transport (see Fig. 1). The rail based transport consists of a 74 km underground or mass transit railway (MTR), a 34 km heavy rail line—the Kowloon Canton Railway (known as the KCR)—linking Kowloon with China, a 32 km light rail transit system in the North West of the New Territories and a 16 km tram system on the North side of Hong Kong Island. Until October 2000, the MTR and KCR were wholly owned by the Hong Kong government. In October 2000, 20% of the MTR was privatised.

Turning to the buses, there are five privately-owned bus companies operating franchised services (The Kowloon Motor Bus Company (KMB) Ltd., New World First Bus Ltd., Citybus Ltd, Long Win Bus Company Ltd and New Lantau Bus Company Ltd). The largest of these is the KMB with 4031 buses in July 1999, four times larger than Citybus Ltd. its nearest rival, with 954 and New World First Bus with 719 buses (Hong Kong Transport Bureau, 2000). There are a total of 573 bus routes. Many routes are non-exclusive except for those operated by the New Lantau Bus Company, whose franchise is confined to Lantau, the largest island in Hong Kong.

<sup>1</sup> £GB1 = 11.4HKD, \$US1 = 7.8HKD and Euro1 = 7.2HKD (as at 30 August 2001).

Table 1

Historic car ownership rates and public transport journeys for Hong Kong [source: Hong Kong Yearbook (various years)]

Year	Population	Private cars	Private cars/1000 pop	Public transport journeys (000)	Public transport journeys/1000 population
1980	5,038,500	190,146	37.7	1,717,925	341.0
1985	5,422,800	144,723	26.7	2,420,364	446.3
1990	5,704,500	197,852	34.7	3,587,400	628.9
1991	5,754,800	212,017	36.8	3,603,935	626.2
1992	5,811,500	237,035	40.8	3,651,707	628.4
1993	5,919,000	259,874	43.9	3,693,734	624.0
1994	6,061,400	279,420	46.1	3,774,896	622.8
1995	6,156,100	285,467	46.4	3,821,090	620.7
1996	6,311,000	293,381	46.5	3,914,015	620.2
1997	6,502,100	314,833	48.4	3,894,953	599.0
1998	6,687,200	318,137	47.6	3,863,100	577.7
1999	6,720,700	321,617	47.9	3,894,750	579.5
2000	6,796,700	332,379	48.9	3,969,582	584.0

There is also a system of minibuses [or public light buses (PLBs)] with not more than 16 seats. Minibuses are red and green, with the green ones having exclusive rights on a fixed route determined by the Transport Department. Fares are fixed and are generally a little higher than the franchised buses. Red minibuses are free to operate anywhere except

where special prohibitions apply, without control exerted over routes or fares. The green minibuses run scheduled services and the red ones operate non-scheduled services. The number of minibuses is fixed at a maximum of 4350 vehicles. In 1999, there were 2305 green minibuses and 2045 red minibuses (Hong Kong Transport Bureau, 2000).

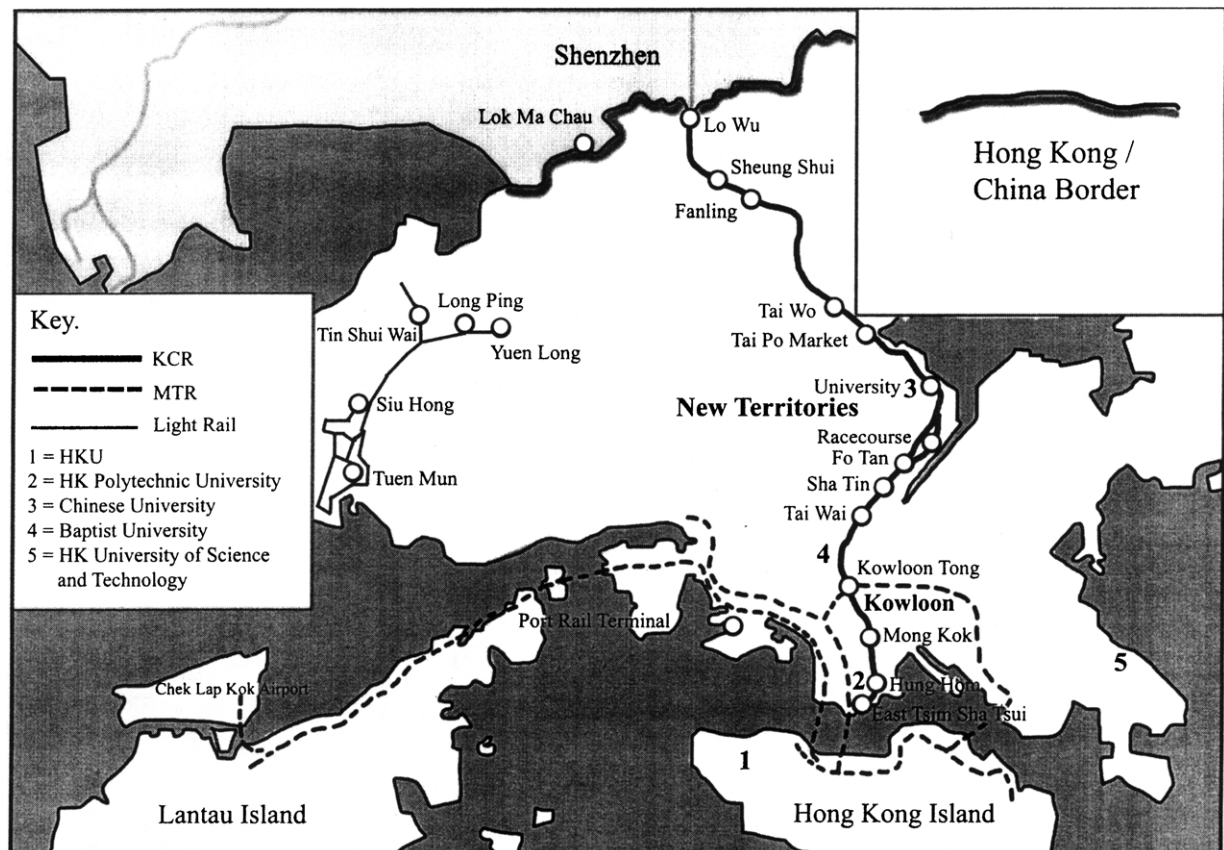


Fig. 1. Transport map of Hong Kong.

Table 2

Average daily passenger journeys by public transport operators 1999 (thousands) [source: Hong Kong Transport Bureau (2000)]

Mode	Journeys (000)	Percentage
Underground (MTRC)	2135	20.1
Heavy rail (KCRC)	757	7.1
Light rail	314	3.0
Tram	241	2.3
Railways subtotal	3447	32.5
Franchised buses	3960	37.3
Minibuses	1570	14.8
Buses subtotal	5530	52.1
Ferries	158	1.5
Taxis	1310	12.3
Other	180	1.7
Total	10,625	100

Both sorts of minibus are privately owned and their operations are not franchised.

Ferry services are run by two main companies. The four cross-harbour routes, which are run using 13 vessels, are operated by the Star Ferry Company Ltd. Two of the routes are franchised and the other two are licensed. The 11 routes to the main outlying islands are franchised and are now run mainly by New World First Ferry Ltd.

Finally, there is a Central-Mid levels escalator and walkway system which is a system of 20 reversible one-way escalators and three travelators plus covered walkways. This system is used by about 34,000 people daily to travel up and down a steep hillside in the Central area of Hong Kong Island.

The breakdown of journeys by public transport mode is illustrated in Table 2. This table shows that over a million journeys a day are made by public transport. Buses are the most frequently used mode of transport, accounting for 52% of the public transport market, with rail accounting for a further 33% of journeys. The MTR carries more passengers than the KCR per km of track because the KCR is confined to the Kowloon side of Hong Kong and thus, does not cover the CBD, where most employment is located. Similarly, the light rail transit system carries fewer passengers because it is confined to a relatively small area of the New Territories.

Public transport frequencies in Hong Kong are generally very high. Trains on the KCR run approximately every 4 min for 18 h a day, whilst underground trains run for 19 h a day and are more frequent. During peak times, underground trains run approximately every 2 min (maximum headway is 105 s). Even off-peak services are every 4–10 min. Buses too are generally very frequent (although it is difficult to give precise frequencies because they vary by route). Apart from overcrowding at peak times, all public transport is very comfortable (on many buses televisions have been installed for added passenger comfort—although there has been a great deal of debate in the papers about whether or not this is desired by

passengers!). The franchising of the bus and ferry services has led to an upgrading of the vehicles, so that most are now very modern. Even the old tram service on Hong Kong Island is being upgraded and trams will be air-conditioned in the future.

In addition, partly because of the frequency of the services, integration between modes is fairly easy. This is aided considerably by the existence of the electronic smart card, the ‘Octopus’, which can be used on much of the public transport (all MTR services, all KCR services, all the main ferry services and around 70% of the bus services). It can even be used in telephones and photo booths within the railway system as well as some supermarkets and coffee shops outside of the system! The card itself is effectively free (a returnable deposit is paid) and can be recharged at any time at all railway stations and a few other convenient locations. The ease of use of the Octopus card encourages the use of public transport and greatly improves the ease of integration. There is no time wasted buying tickets and vehicle loading times are extremely quick. At peak times and at key interchange locations, free-standing octopus machines enable people to board buses at both front and middle doors. This supports the views of White (1995) who puts a great deal of emphasis on the contribution of the Travelcard to the maintaining of public transport patronage in London.

In Hong Kong, nearly all public transport is profitable. It is one of the few places in the world where the underground, the heavy rail system as well as the bus companies all make a profit. Although there is a subsidy to the bus service in that no fuel duty is paid on the diesel used, it would probably make a profit anyway. User prices are very low (with a normal fare for the maximum trip of approximately 30 km on the KCR costing around HKD31 and most fares costing less than HKD6).

#### 4. Methodology

The research instrument used to collect attitudinal data was a face-to-face questionnaire survey of 389 university students across five universities in Hong Kong. The survey, which was conducted in English, took place in December 2000 in cafes and other meeting places on the university campuses. The sample at each university was chosen randomly, except for the age constraint (see next section). The rationale behind the selection of a sample of university students was that these are likely to be the high income earners of the future, and even in a country where car ownership is low, there is still a positive correlation between income and car ownership. In 1992 (the date of the last survey), the average monthly income of car owning households was HKD 30,100 compared to 15,000 in non car-owning households (Hong Kong Transport Department, 1993).

Table 3

Usual mode of transport to University (note: multiple answers were allowed for this question)

Mode of transport	Number	Percentage
Franchised Bus	238	28.0
MTR	189	22.2
Minibus	147	17.3
KCR	129	15.2
Walk	114	13.4
Taxi	15	1.8
Tram	7	0.8
Car	7	0.8
Ferry	4	0.5

## 5. Results of the survey

### 5.1. Background statistics

A total of 389 questionnaires were completed by a cross-section of students from across five of the main universities (The University of Hong Kong, Hong Kong Polytechnic University, Hong Kong University of Science and Technology, Baptist University and Chinese University—see Fig. 1) divided equally between them. Approximately 40% of the respondents were male and 60% female. This does not reflect any gender imbalance in university attendance but is more a reflection of the gender mix of students available to be questioned, using the first to pass method in neutral locations such as cafeterias and open squares. Refusals, although low in number, were not recorded systematically due to a miscommunication problem with the interviewers. There is no reason, however, to believe that this would interfere with the validity of the results.

The interviewers were asked to confine their questioning exclusively to ‘young people’ and to Hong Kong residents, as it is young people’s views that will shape future actions. Respondent’s ages ranged between 18 and 25, with by far the majority (92%) being in the 19–22 age range. Of these, 19.8% lived on Hong Kong Island, 38.8% lived in Kowloon and 41.4% lived in the New Territories. As may be expected because of the location of the universities, there was a significant difference in where the respondents lived according to the University they attended, with more than statistically expected HKU respondents living on the island, more Chinese University students living in the New Territories

Table 4

Frequency of use of main modes of transport (%)

Mode	At least once a week	At least once a month	Very occasionally	Never
Franchised bus	78.0	10.4	11.4	0.3
Minibus	58.8	22.4	17.2	1.6
KCR	38.2	21.3	36.3	4.2
MTR	68.0	21.4	9.9	0.8
Taxi	11.1	24.6	55.8	8.5
Ferry	2.1	8.2	69.1	20.6
Tram	2.9	6.1	66.1	24.9

Table 5

Mean public transport attribute scores (out of 10)

Attribute	Franchised bus	Minibus	KCR	MTR
Comfort	6.5	6.5	6.5	6.7
Reliability	6.1	6	7.5	7.9
Fares	6.8	5.8	5.7	6.7
Frequency	6.1	6.3	6.9	7.8
Speed	5.7	7.3	7.4	8.0
Overall satisfaction	6.5	6.6	6.9	7.7

and more PolyU students living in Kowloon. A very high proportion (92%) of respondents lived with their family and very few students live in Halls of residence in Hong Kong, so this is unlikely to have influenced the results.

### 5.2. Mode use

Before asking attitudinal questions about cars and traffic, student’s travel habits were sought, to discover what modes of transport they used, with what frequency and what their image was of the main public transport modes. The student’s usual method of getting to University is illustrated in Table 3 which shows how few trips are made by private transport. Franchised bus was by far the most popular mode. A comparison of Tables 2 and 3 indicates that, apart from taxis, the order of use of public transport by students is the same as for the population as a whole. Respondents’ general public transport usage is shown in Table 4 which illustrates that public transport is very well frequented by the respondents.

Students were asked to score, on a ten-point scale, each of the four main modes in terms of comfort, reliability, fares, frequency, speed and overall satisfaction. The results, shown in Table 5 indicate that, in general, students are fairly happy with the four main modes of public transport in Hong Kong. The MTR achieves the best score on all attributes except fares, for which franchised bus comes out top.

Overall, respondents appeared to be dependent on public transport for most of their travel and rated the public transport that they used quite highly.

### 5.3. Car ownership and licence holding

Only 15% of respondents’ families had a car. However, in

Table 6  
Responses to car ownership statements

Statement	Number	Percentage
I intend to buy a car one day, but it is not a priority	181	47
I have no intention of buying a car in the next 10 years	125	33
I will buy a car as soon as I can afford one	61	16
I would buy a car now, but parking is difficult/expensive	17	4

60% of respondent's families, at least one driving licence was held. This may be an illustration of the latent demand for cars. Family car ownership bore no relationship to the area in which they lived, which is a little surprising. It may have been anticipated that car ownership in the New Territories would have been higher than on the Island or Kowloon both because of the additional space and perhaps, the additional need for one.

Amazingly, less than 1% of respondents owned a car themselves and illustrates the potential for HK to remain relatively traffic free. However, 6% of respondents had a driving licence themselves and a further 7% were learning to drive. This may reflect a desire to own a car later in life but also may reflect the notion that having a licence is a skill which improves employment opportunities or the desire to hire a car on overseas trips where public transport is not so good. While hiring a car is possible in Hong Kong, it is not a normal thing to do. There are for instance, no car rental kiosks at the airport!

In order to gauge what their attitudes to car ownership were, respondents were asked to state which of four statements best described their situation. Responses are shown in Table 6 where it is shown that 33% of respondents stated that they had no intention of buying a car in the next 10 years. This is a high percentage. A further 47% replied that buying a car was not a priority. Only 20% of respondents showed an immediate desire to own a car.

When further questioned about the likelihood of their buying a car in the next 5 years, 7% answered very likely, 28% quite likely, 39% not very likely and 26% not at all likely. So again, 65% of respondents were unlikely to be getting a car in the next 5 years.

When we look in more detail at the statistics, we find some interesting relationships. First, respondents who come from families with cars are statistically more likely<sup>2</sup> to want to buy a car than those without. This supports the 'club effect' concept of Dupuy (1999), that having a car in the family influences the younger members of the family to get one. Thus once a student has the experience of life with a car, and they can see the benefits of one, they will be more likely to want one. This means that as car ownership grows

Table 7  
Likelihood of buying a car in the next 5 years, by gender ( $\chi^2 = 20.865$ ,  $DF = 3$ )

	Very likely	Quite likely	Not very likely	Not at all likely
Males	18 (12.1)	50 (33.6)	52 (34.9)	29 (19.5)
Females	6 (2.7)	55 (24.3)	95 (42.0)	70 (31.0)

in Hong Kong, there may be pressure for it to increase at a very fast rate.

The other very interesting relationships relate to the gender issue. Significantly more males want to buy a car than females. Twenty-four percent of men would buy a car now if they could afford one, compared to only 11% of women. Similarly, 40% of women have no intention of buying a car in the next ten years compared to only 20.1% of men. The likelihood of buying a car in the next 5 years also differs significantly between men and women, as shown in Table 7. Approximately 46% of men said they would be either quite likely or very likely to buy a car in the next 5 years compared to 27% of women.

Again there was no statistical relationship between whether the respondent had any intention of buying a car and the area in which they lived.

#### 5.4. Attitudes to cars and traffic

To gauge students' attitudes to traffic problems as a whole, respondents were asked to scale seven important issues using a Likert type scale of 4 for very concerned, 3 for slightly concerned, 2 for neutral and 1 for not concerned. In general, students were concerned about a number of issues (shown in Table 8). Overall, 69% of respondents were either very or slightly concerned about traffic in Hong Kong, with less than 2% of respondents being unconcerned by traffic. However, the depth of feeling about traffic was not as great as for other issues. Only 23% were very concerned about traffic compared to 47% for education and 43% for pollution.

If the issues are weighted by their scores, then (as may be expected given the respondents), the issue of most concern to them was education. This was followed by pollution, health, unemployment, traffic, crime and lastly, poverty. Thus although pollution was ranked as cause for second most concern, traffic was only ranked fifth. There is, of course, an obvious relationship between the two issues which may blur the distinction and which may have existed in respondents' minds.

In order to understand more about students' attitudes to cars and traffic matters in general, respondents were asked to state their level of agreement with a number of statements on a 5-point Likert type scale from 5 = strongly agree to 1 = strongly disagree. The results in Table 9 show that nearly 40% of respondents agreed that public transport was so good they did not need a car and just over 50% of respondents disagreed that people suffer without a car.

<sup>2</sup> All the statistical relationships in this paper were found using Chi squared tests at the 0.05 level of significance.

Table 8

Level of concern about important issues

Issue	Very concerned	Slightly concerned	Neutral	Not concerned	Total
Health	143 (42)	133 (39)	57 (17)	8 (2)	341
Pollution	146 (43)	140 (41)	47 (14)	8 (2)	341
Traffic	78 (23)	156 (46)	99 (29)	8 (2)	341
Education	162 (47)	126 (37)	47 (14)	6 (2)	341
Crime	83 (24)	142 (42)	109 (32)	7 (2)	341
Poverty	77 (23)	116 (34)	114 (33)	35 (10)	342
Unemployment	141 (41)	111 (32)	68 (20)	20 (6)	340

However, nearly 40% of respondents would be much happier if they had a car. Only 25% disagreed. The status and image conferred by a car is supported by the fact that 24% of respondents believed that people would think more of them if they had a car. The level of agreement with these two statements is another indication of the pressure for car ownership to increase.

Again, there were some very interesting and important gender differences in attitudes. Significantly more males (18.6%) than females (8.1%) strongly agreed that that they would be much happier if they had a car. Also, significantly more males (30.1%) than females (19.4%) agreed (strongly or slightly) that people would think more of them if they had a car. Fewer than statistically expected men (4.8%) strongly agreed that public transport was so good that they do not need a car and vice-versa (12.3%) for women. In total, 65% of women agreed (strongly or slightly) that public transport was so good they did not need a car compared to 43% of men.

Once again, there was no statistical relationship between where respondents lived and attitudes to these statements.

Respondents were then asked for their attitudes towards traffic in Hong Kong using a further three attitudinal statements. Results (shown in Table 10) show that there was

quite a high level of agreement that traffic fumes are a major contributor to the environmental problems in Hong Kong, although 23% were neutral on this issue. The general message about the link between traffic and the environment seems to have been absorbed by the average student in Hong Kong. However, 30% of respondents agreed that traffic was a healthy sign and should be encouraged. The majority of respondents believe that roads will not be able to cope by 2005. There were no significant gender differences in responses to these questions. However, interestingly, there was a statistically significant relationship between where the respondents lived and their attitude to statement 3 concerning traffic fumes, with respondents living on Hong Kong Island, where pollution is worst, perceiving the link between traffic and pollution to be strongest.

It might be surmised that people who have some intention of buying a car might have different attitudes to the statements above to those who have no intention of buying a car. This might also tell us something about why those people who want a car, do so. Such statistical relationships were indeed found, as is shown in Table 11. For this analysis, because only a few people answered that they would buy a car now if it was not for the parking, these respondents were combined with those who stated that they would buy a car as

Table 9

Agreement with statements about car ownership (% of respondents in each category)

Statement	Strongly agree	Slightly agree	Neutral	Slightly disagree	Strongly disagree	Weighted average
1—I would be much happier if I had a car	12.9	26.3	35.5	15.6	9.7	3.2
2— People would think more of me if I had a car	4.8	19.1	32.5	28.3	15.3	2.7
3— Public transport is so good I do not need a car	7.3	31.9	38.9	17.6	4.3	3.2
4— People without cars suffer because modern life favours people with cars	4.8	17.0	28.1	33.4	16.7	2.60



Table 10  
Attitudes towards statements about traffic (% of respondents in each category)

Statement	Strongly agree	Slightly agree	Neutral	Slightly disagree	Strongly disagree	Weighted average
1— Growth in vehicle traffic is a sign of a healthy economy and should be encouraged	8.2	23.0	38.9	23.5	6.4	3.03
2— Traffic is increasing so fast that existing roads will not be able to cope by the year 2005	17.7	43.8	26.7	10.0	1.9	3.65
3— Traffic fumes are a major contributor to the environmental problems in Hong Kong	40.0	32.0	22.8	4.0	1.3	4.05

soon as they could afford one. Both categories of respondent imply a desire to have a car.

The results of the analysis show that for the first two statements, those who want a car are statistically more likely to agree with the statement and less likely to disagree than the other two categories. For the third statement, those who want a car are less likely to agree and those who have no intention of getting a car are more likely to agree.

Thus, it seems that those who have no intention of getting a car seem to think that public transport is pretty good and that there are no status problems with public transport. They

are happy without a car. However, there is another group of people who want a car because they feel that public transport is lacking and they would like one for status purposes.

The same results occur, but with even higher chi-squareds if the likelihood of buying a car in the next 5 years is used rather than wanting or not wanting a car.

## 6. Conclusions

This paper set out to investigate whether the provision of

Table 11  
Agreement with statement by degree of wanting a car (figures in brackets are percentages)

	Strongly agree	Slightly agree	Neutral	Slightly disagree	Strongly disagree
Statement: People without cars suffer because modern life favours people with cars ( $\chi^2 = 33.6$ , $DF = 8$ )					
Want a car	8 (10.5)	26 (34.2)	20 (26.3)	13 (17.1)	9 (11.8)
Not a priority	6 (3.4)	25 (14.3)	48 (27.4)	68 (38.9)	28 (16)
Don't want a car	4 (3.3)	13 (10.7)	35 (28.9)	43 (35.5)	26 (21.5)
Statement: I would be much happier if I had a car ( $\chi^2 = 109.341$ , $DF = 8$ )					
Want a car	28 (38.9)	19 (26.4)	18 (25.0)	5 (6.9)	2 (2.8)
Not a priority	14 (8.0)	62 (35.4)	72 (41.1)	19 (10.9)	8 (4.6)
Don't want a car	6 (5.0)	14 (11.6)	41 (33.9)	34 (28.1)	26 (21.5)
Statement: People would think more of me if I had a car ( $\chi^2 = 29.090$ , $DF = 8$ )					
Want a car	9 (12.5)	11 (15.3)	33 (45.8)	10 (13.9)	9 (12.5)
Not a priority	7 (4.0)	34 (19.4)	56 (32.0)	56 (32)	22 (12.6)
Don't want a car	2 (1.7)	24 (19.8)	30 (24.8)	39 (32.2)	26 (21.5)
Statement: Public transport is so good I do not need a car ( $\chi^2 = 23.864$ , $DF = 8$ )					
Want a car	2 (2.8)	14 (19.4)	36 (50.0)	16 (22.2)	4 (5.6)
Not a priority	9 (5.2)	56 (32.2)	72 (41.4)	31 (17.8)	6 (3.5)
Don't want a car	16 (13.3)	48 (40.0)	33 (27.5)	17 (14.2)	6 (5.0)

good overall public transport could deter people from car ownership and use. It uses the example of Hong Kong, where GDP is high, car ownership is low and public transport is very good. The results appear to paint a mixed, although mostly positive, picture. Respondents to the questionnaire were frequent users of public transport and rated it pretty highly. Car ownership amongst them was virtually non-existent. Sixty-five percent stated that they were unlikely to buy a car in the next 5 years, and 33% said that they had no intention of buying a car in the next 10 years. Nearly 40% of respondents agreed with the statement that public transport was so good that they did not need a car. On the negative side, there did appear to be quite a substantial latent demand for a car, particularly amongst the male students. For this group of people, penalties to car ownership may need to be introduced to deter them further. This is something that will need to be faced by the Hong Kong Government.

The attitude of male students towards car ownership was found to be substantially more favourable than that of the female students. Male students were more likely than female students to view car ownership as something that would add to their lives and their image whilst female students appeared to be more content than their male counterparts to rely on public transport. Reasons for this gender difference in attitudes are unknown and can only be ascribed to the traditional 'nurture' type whereby men are more likely to be brought up with cars as a symbol of masculinity (see, for instance, Stokes and Cullinane, 1992).

The overall conclusion has to be, however, that if public transport is generally perceived to be both good and cheap, it can suppress the demand for cars. Individual traffic demand management measures, especially when public transport is perceived to be generally of poor quality, may have little impact on mode choice simply because such measures are not sufficient in scale to have an impact on the choice decisions of individuals. The problem lies in determining at what level of public transport provision car ownership and use decisions are affected, i.e. is there a threshold level of public transport provision that will deter car usage? Furthermore, would this level of public transport be so costly as to be prohibitive? Interestingly, all forms of public transport provision in Hong Kong are profitable and run without direct subsidies. However, for most Western countries, getting to the stage where passenger volumes are so high that profitability can be achieved is a long and difficult path. Cities such as Oxford, Zurich and Freiburg, to name a few, have, however, gone some way to proving that it is possible, with commitment.

## Acknowledgements

Thanks go to two anonymous referees for their helpful comments on an earlier draft of this paper.

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