TOWARDS AN APPROPRIATE TIME VALUATION PRACTICE IN THE THIRD WORLD

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1. INTRODUCTION

In recent years, the phenomenon of rapid urbanisation and population growth has created in third world cities conditions under which the conventional urban transport planning process has become justifiable, if not always appropriate. As a consequence, monetary valuation of travel time savings has been made and the results used as an input to the task of modelling existing and future travel demand and evaluating alternative transport investment strategies. For many of these studies, benefits attributable to travel time savings have constituted the largest single component of the determined benefit streams (Table 1) and thus come to play a key role in urban transport investment decisions. Moreover, increasing rural development activities are also creating situations in which some existing rural roads are needing to be considered for upgrading. In that decision, it can be expected that travel time savings benefits will play a bigger role than hitherto.

The above emerging pivotal role of travel time savings benefits in transport investment decisions in the third world requires that the approach and logic for the determination of time values in these countries be demonstrably rational and be founded on theoretical and empirical evidence from within their developmental context. With up to 88% of total measured benefits attributed to savings in travel time (Table 1), considerable scope exists for the wrong transport investment decision to be arrived at if it is in fact inappropriate for time values to be determined in the third world according to western practice.

The purpose in this paper is to examine, from a third world standpoint, the basis for time valuation practice in the industrialised countries and draw conclusions on the implications of the findings for time valuation studies in the third world. The examination is focused on a critical discussion of the validity under conditions typically found in the third world of the two economic approaches underpinning current time valuation practice: the marginal productivity of labour theory and the consumer choice/utility maximising theory.

It should be stated that the discussion presented in this paper forms part of a wider study into theoretical and methodological aspects of time valuation practice in the third world recently completed by the author (Banjo, 1981). As part of that study, a questionnaire survey was undertaken amongst travellers by air and land public transport modes between the cities of Lagos and Ibadan. Some empirical results from that survey relating to travellers' time budgeting behaviour and valuation of their travel time savings are incorporated into the present discussion in support of some points raised.

TABLE 1. COMPOSITION OF MEASURED BENEFITS FROM ROAD INVESTMENT (%)

	Lagos-Ibadan Feasibility Study	Metroplan-Manila Study	Lagos Metropolitan Area Transportation Study
Vehicle Operating Cost Savings	48.0	35.0	4.7
Travel Time Savings	50.0	65.0	87.7
Reduced Congestion	2.0	-	-
Producer's Benefits	-	-	7.6

DIVISION OF TIME BENEFITS

	Lagos Metropolitan Area Transportation Study	Metroplan Manila Study
Car Users	34%	46%
Public Transit Users	66%	54%

SOURCES: 1. Lagos-Ibadan Road Feasibility Report, FMWH, Lagos.

2. Lagos Metropolitan Area Transportation Study, FMWH, Lagos.

3. Metroplan for Manila, Report of Study.

It needs to be emphasised that the circumstances prevailing in Nigeria form the background for the discussion presented in this paper. This does not imply a belief that Nigeria is a typical third world country. However, within its great bulk, it contains many of the features typifying such nations: a rapid rate of urbanisation and population growth, a highly skewed income distribution, high unemployment and underemployment, shortages of skilled and technical manpower, etc. Therefore, it can be expected that many of the points to be made in relation to Nigeria will be relevant to other developing countries.

2. THE MARGINAL PRODUCTIVITY APPROACH IN A THIRD WORLD CONTEXT

The marginal productivity of labour theory, often referred to in time valuation studies as the cost savings approach, may be stated as follows:

APPROPRIATE TIME VALUATION by: G. A. Banjo

> 'Employers hire labour until it is no longer worth their while to do so. Since it is assumed that all workers of a given type are paid the same, the average wage of a group is the marginal value product; hence the wage rate is a good measure of the value of production gained or lost by changes in the labour force, so long as the changes are small relative to the markets in which the prices are set'.
>
> (Harrison and Quarmby, 1972)

In time valuation studies, a modified form of the wage rate is commonly adopted. In this form, the 'wage rate' is the total cost to the employer of using labour, i.e. actual wage paid plus an increment to cover such costs as social insurance, employment taxes, cost of providing uniforms, etc. In countries such as the U.K., this marginal wage increment has been found to be about 10% of the wage rate (Leitch, 1972). Although values of this order have been adopted for use in the third world, there are in fact factors present to support the view that in Nigeria the wage increment is a much higher proportion of the wage rate.

Of these factors, the most important is the free or heavily subsidised housing and transport services provided by many Nigerian employers to their middle and senior level employees. Especially in the major urban centres, the cost to the employer of providing these benefits is greater than the salary of the particular employees involved. Since the provision of these benefits is widespread in both the public and private sector, it affects a significant proportion of, at least, the professionally and technically qualified travelling population. With these the people most likely among the travelling population to be involved in car ownership and use, it is appropriate that the cost to the employer of providing the above benefits be incorporated into the modified wage rate. In effect, this would increase, the value placed on the working time savings of these group of workers. Not only does this have distributional implications, evidence is presented below of the high likelihood that working times saved by this group of workers will be spent on their own personal business. Thus, derivation of the resource value of time using the modified wage rate may in fact yield the wrong estimate of the productive value of the saved time.

Returning to the above definition of the theory, there are several objections that can be made against it, most of them prompted by perfect competition and equilibrium assumptions underlying it. The objections are strengthened by the absence of a specific objective function in its basic formulation. And these objections are reinforced rather than weakened if it is assumed, in line with classical economic theory on which the formulation is founded, that the implicit objective function to be maximised is the Gross National Product (GNP). The remainder of this section of the paper is devoted to a discussion of these possible objections using the organisational framework of Harrison and Quarmby's seminal paper on the subject (Harrison and Quarmby, 1972).

Objection 1: Effects of Imperfections in the Labour Market

This objection concerns the imperfections in the labour market which may be such that the 'value in other use' of the labour using transport is not adequately represented by the wage rate. In effect, the alternative use value of labour may not be reflected by the wage rate.

APPROPRIATE TIME VALUATION by: G. A. Banjo

In Nigeria, the transport industry is characterised by strong unionisation and low educational standards, especially among drivers (Walker, 1959). These factors have compounding effects, the first leading to high wage rates/income and the latter to a low alternative use value on the open labour market. In this respect, it is worthwhile mentioning that, historically, commercial vehicle drivers have been relatively well paid, a form of assurance on the part of the employer that the drivers would-not be tempted to appropriate the valuable goods and vehicles in their charge (Walker, 1959).

However, for non-transport industries, the fact that labour is much under-compensated in Nigeria has been demonstrated (Osakwe, 1975). As a consequence, the wage rates of industrial workers do not represent their worth/contribution to the economy and are therefore inaccurate indicators of the resource value of their time. From this economic standpoint, the effect of using the wage rate will be to under-estimate the resource value of the time of low income workers, who account for a major proportion of the industrial workforce.

How the points raised above should be interpreted with regard to working time valuation, and what influence the manpower shortages in key sectors of the economy discussed below should have on that interpretation, depends to an extent on whether they are regarded as transitory or permanent features of the economy.

If these features are judged to be transitory, then a single approach of using either the wage rate or overtime rate may be adequate. If they are considered to be permanent however, say lasting a decade or two, then such an approach must be taken as too simplistic. It may then be more appropriate separately to consider what the situation is in particular industries/occupational groupings in order to determine the correct treatment for that industry/occupational group.

Whether an assumption of transition or permanence is made however involves a political decision as it raises issues related to developmental objectives and strategies. Such a decision therefore cannot be lightly taken and must require more empirical evidence than currently exists.

It is of course the case that the transport and housing subsidy issue raised earlier tends to increase the real disposable income of some group of employees (Banjo, 1980). This arises, for example, from the tendency for such housing to be located close to the place of employment thus reducing the travel time and cost associated with the journey to work.

One last point is that the issue of under-compensation of low income industrial workers, or any other group, has an impact on one of the major transport issues facing many third world countries in their major cities and towns. This is the issue of the intra-sectoral allocation of investment between public and private modes of transport. It may be that if the correct values of benefit indicators, such as travel time savings, are used in the evaluation of such investment decisions, public transport investment may have stronger economic support than currently is the case since the dominant users of this mode of transport are the low income group. The question of course is how to determine the correct resource value of time, i.e. the 'shadow' wage rate of these groups of workers. That is a difficult question but a fruitful starting point may be to

derive it from the net value of what the worker produces since this represents his true contribution to the economy.

The last point has been discussed at some length because it arises from one of the differences between the circumstances of third world and developed economies that provide the justification for this present exercise. This is that, in the third world, the majority of travellers during working time are from the low income groups, mainly in the informal sector, engaged in trading and distributive activities but also in the formal sector in the form of messengers. This contrasts with the situation in the developed countries where most of these travelling during working time are middle to high income earners such as salesmen and commercial vehicle drivers. In view of the fact that the informal sector is often a bigger employer than the formal sector and that it is now recognised as providing 'a wide range of low cost, labour intensive, competitive goods and services' and therefore a 'source of future growth' (ILO, 1972), it is clearly wrong to attach unnecessarily low values to the time of these so engaged. To do so is to accord low importance to the future growth of the economy.

Objection 2. The release of resources assumed in theory may not take place

In the more developed countries, labour restrictions are usually advanced for the relevance of this objection. This however is not the case in Nigeria where the level of restrictive practices is such that there are few instances in which they represent a significant impediment to the release of resources.

A more serious obstacle relates to developmental factors such as:

(1) the paucity and poor conditions of local and distributor roads

(2) bad road maintenance practice

(3) general unreliability of most transport services

(4) non-transport sector deficiencies such as the ubiquitious cuts in the electric power supply.

As a result of the presence of factors such as those above, it is often the case that time saved in one location is simply lost in another.

The above points are raised because practice is to pursue and quantify travel time savings without paying due regard to how the translation of such time savings into productive use is to be effected. For example, in urban transport studies, practice is to base the capacity of local urban roads on their physical dimension. Whilst this is appropriate in the Western context where such roads are invariably constructed and maintained to a high standard, it is inappropriate in the third world where such roads are more often than not in a bad state of repair and often impassable. Given that it is these roads that feed traffic onto the main road network

that is the focus of urban transport studies, the consequence of adopting their physical rather than real traffic capacity is the generation of spurrious travel time savings and the making of inappropriate transport investment decisions.

The inter-relationship between time savings on different types of roads points to a need for balance in the level and rate of investment on the different tiers of the transport network. The reality is that the concentration of investment on major transport facilities at the expense of minor ones will ultimately lead to the investment not being cost effective. This point is particularly relevant to third world cities such as Lagos which, because of their rapid and uncontrolled expansion, have many areas with a woefully inadequate local road network.

Release of resources however is not simply a function of road system factors. It is also a function of operational factors such as vehicle maintenance practice, availability of spare parts and the effect of import restrictions on the supply of new vehicles. In Nigeria, as in many third world countries, spare parts shortage have led to widespread 'cannabalising' of vehicles, especially among public transport operators. This and the stringent import restrictions that exist must reduce the extent to which time savings are translated to resource savings. The likelihood of this translation being achieved is further reduced by the limited provision of roadside services such as petrol filling stations, rest houses, etc. along most inter-urban routes. This constraints operating schedules and restricts within a narrow band the magnitude of time savings that may be converted into resource savings.

The constraint imposed on the translation of saved travel time savings into productive use by non-transport factors suggests that the determination of benefits from transport development cannot be divorced from overall developmental goals and policies. Thus, it is important for there to be intersectoral coordination of policies and, perhaps more important, consistency in the use/determination of technical parameters. In this respect, it is arguable that investment in post and telecommunication could in many instances be a more cost effective means of saving travel time.

The above discussion suggests that time savings valuation has to be seen in the wider context of how such savings contribute to a more efficient use/allocation of human resources as a whole. Adoption of this perception of the need to save time however means that time valuation studies have to be conducted within a wider framework than hitherto involving consideration of overall time budget expenditures and of the constraints/opportunities for better allocation of time resources at institutional and other levels.

Objection 3: Labour resources have other uses

An assumption present in the definition of the marginal productivity theory is that labour resources have other productive (in an economic sense) uses. However, in a country of high unemployment and underemployment such as Nigeria, this assumption is manifestly untrue. It is an unfortunate fact that the rapid expansion of the Nigerian economy over the last decade has done little to increase the employment opportunity of the average Nigerian

worker. With no social welfare system to speak of which might otherwise provide compensation for those without work the unemployed must view the attendant high leisure time mainly as a disutility. On a strict interpretation, therefore, the objection is valid, at least at the macro level.

Objection 4: Workers and employers share the same objectives

An additional weakness of the marginal productivity theory in relation to time evaluation is that it values working time purely from the viewpoint of the employer. It therefore does not consider the value the employee may p place on the savings in journey time and hence the way his work time is spent.

That the Nigerian worker perceives work differently from his employer is suggested by the widespread practice of the former to receive visitors and engage in private activities during the working day. The attitude seems to be that 'work tasks' are just one of the ways in which to occupy the 'working day'. As seen later, work tasks do not necessarily coincide with 'employer's business' and may include supplementary employment on own account.

The above perception of work tasks is most noticeable among office workers and may consume as much as three hours of their working day. Whilst reflective of the country's stage of development in some respect, it is also indicative of their cultural perception of time, a dimension not considered in economic studies of time. This cultural perception has been conditioned by the norms obtaining in the traditional sector of the economy which, by and large, still determine Nigerian society's attitude of time.

In the traditional form of employment such as agriculture, time is measured not in terms of minutes and hours but more in periods of days, weeks, months and even seasons. Thus, there is no need to observe a strict regime of time consciousness. It is this attitude which still dominates time perception in Nigeria and influences people's behaviour during their working hours.

Following from the above, it is apparent that from the employee's viewpoint it would be difficult to distinguish between the utility and value of working and non-working time savings and likewise to establish when travel is viewed as a disutility, when it is used productively and for whose benefit (employer's or the traveller's own).

Thus the opportunity cost of working time must be viewed as having a 'behavioural' component. A difficulty however is how this 'behavioural' component is viewed and valued by both the employer and the employee since it will probably vary with the spatial location of the individual's work and other activities.

A further question of course is whether the employer is aware of the situation described above and, if so, has taken it into account in setting wage rates. Certainly there must be a significant shortfall between theoretical and realised resource values of working time which no employer could reasonably ignore.

APPROPRIATE TIME VALUATION by: G. A. Banjo

Taken together the above discussion suggests that all things being equal, people are more likely than otherwise to attach higher values to travel time times saved whilst on their own business than when on their employer's. Empirical evidence in support of this interpretation has been found (Banjo, 1981) and Table 2, the consistency of which suggests that the above are behavioural factors the effects of which are not confined to a particular socio-economic group. It therefore cannot be assumed that such patterns of behaviour will necessarily disappear with economic development and improved general welfare.

From the foregoing discussion, it has to be concluded that the marginal productivity theory is a suspect basis for determining the value of time savings during working time. Not only is the modified wage rate unlikely to yield an accurate estimate of working time values, both the translation of saved times into resource savings is constrained by system, operational and cultural factors. The delineation of the influence of each of these factors is likely to prove difficult using the marginal productivity approach and may in any case not be a worthwhile task.

NON-WORKING TIME VALUATION AND THE CONSUMER CHOICE THEORY

In economic science, consumer choice theory is used to explain an individual's preference among 'alternative baskets of goods'. In relation to non-working travel time evaluation, it is used to explain the combination of leisure and work activities that maximises the individual's satisfaction. The theory is based on the assumption that, at equilibrium, the individual will divide his time between work and leisure so that the rate of substitution between income and leisure is equal to the wage rate. However, most empirical evidence have tended to support the contrary view that, outside working hours, non-work travel time savings are valued significantly less than the wage rate (Goodwin and Hensher 1978).

In practice, it is possible to identify two distinct effects of the theory. The first is the 'substitution effect' which infers that as wages go up the attractiveness of work is increased, other things remaining equal. The second effect is the 'income effect' whereby, with increasing income, an individual desires more leisure. These two effects however operate in opposite directions and present complications in the application of the consumer-choice theory.

APPROPRIATE TIME VALUATION by: J. A. Banjo

TABLE 2: MEAN VALUES OF TRAVEL TIME SAVINGS (NAIRA/HOUR)

	Travellers on employer's business			Travellers not on employer's business			Travellers without supplementary employment			Travellers with supplementary employment		
CRITERION VARIABLE	(1)	(2)	N(f)	(1)	(2)	N(f)	(1)	(2)	N(f)	(1)	(2)	N(f)
TRAVMODE												
1. Cartaxi	1.59 (0.63)	87	11	2.10 (0.97)	109	65	1.66 (0.88)	92	52	3.00 (0.93)	142	16
2. Midibus	1.66 (0.69)	90	58	2.21 (0.87)	175	296	2.01 (0.86)	144	210	1.89 (0.89)	139	93
3. Aircraft	2.20 (0.98)	92	10	1.93 (0.86)	78	29	1.92 (0.91)	75	25	2.52 (0.83)	92	9
RESPLACE												
4. Lagos	1.76 (0.82)	100	45	2.13 (0.88)	150	280	1.93 (0.89)	125	189	2.05 (0.95)	149	83
5. Ibadan	1.65 (0.61)	77	26	2.43 (0.93)	190	82	2.06 (0.85)	144	76	2.41 (0.93)	116	22
8. Others	1.81 (0.75)	45	6	1.80 (0.65)	73	24	1.69 (0.61)	81	16	1.77 (0.54)	60	11
INTTIME												
7. Morning	1.72 (0.63)	79	47	2.24 (0.88)	158	226	1.88 (0.87)	109	145	2.11 (0.84)	146	81
8. Afternoon	1.71 (0.90)	90	32	2.08 (0.88)	140	164	2.01 (0.87)	141	140	2.04 (1.08)	100	37
SEX												
8. Male	1.91 (0.79)	90	51	1.90 (0.85)	116	158	1.75 (0.74)	98	127	1.84 (0.92)	108	55
10. Female	1.46 (0.43)	82	7	1.75 (0.83)	155	72	1.50 (0.81)	134	47	1.77 (0.84)	113	19
OCCGRP												
21. Group 1	2.11 (0.90)	44	5	2.32 (0.93)	53	42	1.69 (0.88)	41	27	3.20 (1.01)	97	11
12. Group 2	1.73 (0.75)	55	28	2.19 (0.94)	89	73	1.78 (0.69)	69	66	2.01 (1.08)	64	27
13. Group 3	1.77 (0.76)	148	36	2.21 (0.74)	223	134	1.93 (0.81)	212	104	2.42 (0.71)	181	43
14. Group 4	1.46 (0.65)	142	10	2.10 (1.03)	253	78	2.04 (0.99)	194	62	1.61 (0.76)	260	18
15. Group 5	1.00 (-)	164	1	2.10 (0.91)	404	51	2.74 (0.92)	483	20	1.20 (0.82)	255	18
CAROWNED												
26. None	1.75 (0.72)	117	51	2.06 (0.88)	200	281	2.01 (0.90)	185	204	1.80 (0.77)	135	83
17. One or more	1.65 (0.81)	54	27	2.44 (0.89)	93	109	1.78 (0.74)	64	81	2.76 (0.98)	100	35
INCOMGT												
18. 1-2000	1.37 (0.62)	209	27	2.23 (0.87)	314	189	2.04 (0.87)	287	134	2.27 (0.91)	295	53
19. 2001-4000	2.97 (0.83)	109	21	2.17 (0.93)	110	79	2.88 (0.83)	92	67	2.16 (0.97)	116	23
20. 4001-6000	1.43 (0.40)	54	23	1.69 (0.51)	63	29	1.48 (0.64)	58	29	1.69 (0.75)	52	11
21. > 6000	2.00 (0.92)	45	13	2.54 (0.55)	47	17	2.05 (0.75)	48	18	2.20 (0.57)	46	8
EMPTYPE												
22. Main emp.only	1.67 (0.78)	85	55	2.01 (0.88)	236	230	2.94 (0.87)	123	289	-	-	-
23. With supp.emp.	1.77 (0.67)	73	19	2.15 (0.94)	157	99	-	-	-	2.09 (0.92)	128	118
ACCMTYPE												
24. Single room	2.68 (0.64)	163	35	2.44 (0.88)	246	146	2.19 (0.81)	227	107	2.18 (0.92)	198	32
25. Flatlet	2.00 (0.94)	113	10	2.23 (0.87)	144	102	2.01 (0.91)	118	63	2.49 (0.94)	199	26
26. Flat	1.57 (0.57)	48	28	1.75 (0.88)	99	110	1.58 (0.87)	75	93	1.68 (0.80)	75	33
27. House	2.23 (1.28)	73	5	2.18 (0.78)	88	26	2.04 (0.94)	108	23	2.08 (0.97)	48	5
TRFREQ												
28. < Weekly	1.61 (0.73)	66	25	2.76 (0.88)	127	71	2.30 (0.88)	100	70	3.12 (1.00)	130	18
29. < Weekly > monthly	2.05 (0.85)	308	35	1.13 (0.79)	165	129	2.04 (0.91)	142	94	2.35 (0.62)	134	34
30. < Monthly	1.05 (0.62)	53	5	2.32 (0.87)	182	41	2.07 (0.93)	126	29	1.81 (1.00)	163	22
BACKTIME												
31. Same day	2.08 (0.63)	131	13	2.70 (0.95)	144	57	2.23 (0.93)	110	37	2.76 (0.89)	178	23
32. Next day	2.00 (0.81)	92	16	1.89 (0.84)	131	114	2.07 (0.93)	131	72	1.57 (0.67)	92	34
33. Within a week	1.56 (0.50)	70	15	1.94 (0.82)	132	114	1.70 (0.75)	114	87	1.91 (0.98)	118	29
34. After a week	1.53 (0.84)	74	33	2.49 (0.84)	211	96	2.02 (0.83)	136	81	2.31 (0.91)	143	32
TRVRESN												
35. Employer's	1.72 (0.75)	83	78	-	-	-	1.67 (0.78)	85	55	1.77 (0.67)	73	19
36. Personal	-	-	-	2.23 (0.85)	125	155	2.07 (0.15)	110	95	2.51 (0.93)	163	42
17. Family	-	-	-	2.08 (0.98)	172	149	1.92 (0.99)	152	83	1.87 (0.86)	161	38
38. Social and leisure	-	-	-	2.14 (0.81)	170	77	2.03 (0.77)	181	51	1.89 (1.12)	108	18
RTCHIC												
39. Via Abeokuta	2.00 (-)	51	1	1.56 (0.75)	123	10	1.23 (0.41)	-	3	1.33 (0.55)	68	6
40. Via Shagamu	2.35 (0.75)	153	16	1.74 (0.87)	174	84	1.89 (0.77)	160	54	1.55 (1.15)	157	29
41. Via Expressway	1.58 (0.72)	75	36	2.27 (0.88)	146	267	1.98 (0.90)	118	210	2.33 (0.87)	137	74
42. Via Ijebu-Ode	1.27 (0.78)	54	4	2.88 (0.77)	181	25	1.76 (0.59)	137	16	2.61 (0.64)	122	7

Notes: 1. Acronyms are as defined on Table 3 except = INTTIME = Time of interview; BACKTIME = When returning and RTCHIC = Route Choice.
2. ( ) Coeff. of variation. 3. N(f) Sample size factored. 4. Cols.(1) and (2) are values in Naira/hr. and as % of wage rate respectively.
5. Asterisks denote level of significance of within-group differences: *** = 1%, ** = 5% and * = 10%.

APPROPRIATE TIME VALUATION by: G. A. Banjo

The consumer-choice theory formulation

The consumer-choice theory may be formulated algebraically by maximising the utility function:-

$$U = U(L, y) \quad (1)$$

where L = leisure time
y = income
and U = the utility
subject to a time constraint

$$T = L + W \quad (2)$$

and a budget constraint,

$$pW = y \quad (3)$$

where T = total time available
W = total time spent working
and p = the wage rate.

Interpreting this according to classical economic theory, the full utility of work is represented by the wage rate and the consumer maximises L and y in a mutually exclusive manner.

A reformulation of the theory to account for the fact that activity at work may affect the consumer's utility level and based on the three variables leisure, work and income has been forwarded (Johnsen, 1966; Oort, 1969) as follows:

$$U = U(L, W, y) \quad (4)$$

subject to the previously defined time and budget constraint which however, are not now reducible to one. Lagrange transformation of equation (4) subject to (2) and (3), yields:-

$$\frac{dU}{dL} = p\frac{dU}{dy} - \frac{dU}{dW} \quad (5)$$

That is, the marginal utility of leisure time is equal to the gross wage rate less the marginal disutility of work.

For the formulation presented above to be valid, an important condition is that individuals are able to freely vary the total hours that they work and thus their non-work time. Whether this condition is met in Nigeria can be examined at the macro and micro levels.

Consumer-choice theory under existing Nigerian conditions

At the macro level, the condition is clearly not met because of the high unemployment and underemployment which exist in Nigeria mentioned earlier. While official government statistics quote an unemployment level of around 15% for the major urban centres (Biejemaeh 1978), unofficial sources

consider the real figure to be much higher. While it is likely that some of the unemployed will be engaged in petty trading or casual labouring, it cannot be said that they have freedom to work only when they wish to.

In contrast, at the micro level, this condition appears to be satisfied by some groups of workers. This conclusion is suggested from the examination of the working hours and average gross earnings of some of the respondents interviewed during the questionnaire survey of travellers along the Lagos-Ibadan traffic corridor. As part of that survey, people were asked to indicate the number of hours that they spent daily in main and supplementary employment, the latter being defined as economic activity outside the place of main employment (overtime is thus excluded).

Analysis of the survey data revealed that 28% of respondents who gave information on their income engaged in supplementary employment. This compares with a range of 3 to 7 per cent for multiple employment for Great Britain (New Earnings Survey, 1973) and is despite the fact that at the time of the survey, legislation aimed at making illegal such activities by government employees was given much publicity and might be expected to discourage respondents disclosing such employment.

Of the 28% having supplementary employment, 62% were in non-manual main employment while 13% were in manual main employment. It is worth noting that the non-manual workers having supplementary employment were mainly in the senior and intermediate occupational groups representing 77% of all non-manual respondents. These are the groups in which there exists the greatest manpower shortages in Nigeria (Yesufu, Diejomaoh and Oduah, 1973).

While these figures cannot be taken as ultimate confirmation, they do suggest that the assumption of freely variable working hours has some validity among non-manual workers. As it is very likely that manual workers also engage in overtime work, the same conclusion can be drawn in relation to them. This inference must however be tempered by the fact that with manual wage rates being almost below subsistence level, this freedom is more apparent than real.

Further support for the above conclusion is forthcoming from the working hours and earnings data from the previously mentioned survey which indicate that the workers with the highest working hours are the self-employed with 43.1 hours spent on main employment and 16.0 hours spent on supplementary employment giving a total of 59.1 hours. Next came the senior and intermediate professional workers with 41.0 hours and 15.0 hours on main and supplementary employments respectively and manual workers with respective figures of 42.5 hours and 14.1 hours. These figures indicate that the above workers spend as much as 37% of their basic work hours again engaged in supplementary employment. Consequently, a significant proportion of their income can be expected to be derived from this type of employment.

The potential contribution of supplementary employment to workers' total earnings can be judged from Table 3 which shows the gross annual income from this employment source as a percentage of estimated total annual income. Taken from Banjo (1981), these figures have been derived from the

annual income stated by respondents from the Lagos-Ibadan travellers survey by making the assumption that supplementary employment attracts the same wage rate as main employment. In reality, it is likely that the wage rate from supplementary employment for manual workers will be lower than that received from their main employment whilst higher for non-manual workers. This is because supplementary employment for the former worker group commonly takes the form of petty trading, paid apprenticeships, etc. Whereas for the latter group (especially the professionally and technically qualified) it takes the form of commissions/retainerships which invariably commands wage rates higher than from main employment. Generally however, for all groups, the utility of the income from supplementary employment is likely to be greater largely due to its non-declaration for tax purposes. By deriving the two sets of results given in Table 3, it is however possible to obtain an indication of the potential upper and lower ranges of the percentage contribution of supplementary employment earnings to total earnings; the occupational categories used in Table 3 are explained in Table 4.

Referring to Table 3, whichever of the two sets of results is taken as the more likely, the clear evidence is that supplementary employment is a significant source of income across all sections of the population. It follows therefore that it must influence people's propensity to save time and, indeed, affect their time budgeting behaviour in general. As demonstrated in Banjo and Brown (1981), one particular effect of engagement in supplementary employment is for less time to be spent travelling. This is indicative of a greater propensity by people with such employment to save travel time and thus to place a higher valuation on their travel time savings relative to people without such employment. Evidence in support of this deduction is forthcoming in the values of travel time savings derived for respondents with and without such employment (Table 2) in the Lagos-Ibadan travellers survey.

Examining the appropriate results of Table 2, the consistent pattern is for engagement in supplementary employment to lead to the placement of higher values on travel time savings. The strength of this trend suggests that this is a notable result despite the smallness of the sample sizes on which values for some group of respondents were based. It should however be stated that the contrasting reasons for the engagement in supplementary employment may lead to departures from the above general trend, perhaps reflecting the type of employment involved.

By way of a digression, it is worth drawing attention to the marked variation in the derived values of time as a percentage of the wage rate for different groups of respondents - columns 2 of Table 3. This reflects, among other factors, the irregularity in the number of hours worked by respondents and the likelihood that their income is derived from different employment sources, each attracting a different wage rate. This is much unlike the industrialised countries where, typically, each worker has only one source of employment and thus only one wage rate, resulting in a commensitantly low variation in the relationship between wage rates and values of time for different sub-groups.

TABLE 3: GROSS ANNUAL INCOME FROM SUPPLEMENTARY EMPLOYMENT AS A PERCENTAGE OF ESTIMATED TOTAL ANNUAL INCOME

CRITERION* VARIABLE	If stated annual income relates to main employment only	If stated annual income relates to all employment
RESPLACE		
Lagos	29.2	20.9
Ibadan	38.6	22.8
Others	27.5	19.9
SEX		
Male	28.6	20.5
Female	27.8	20.3
OCCGRP		
Group 1	25.8	18.9
Group 2	27.4	20.2
Group 3	38.2	23.4
Group 4	26.1	20.3
Group 5	24.6	19.1
CAROWNED		
None	29.2	21.6
One or more	32.9	20.6
INCOME		
1-2000	32.0	22.6
2001-4000	33.4	20.7
4001-6000	35.6	24.2
6001-8000	23.1	24.2
>8000	21.2	15.9
EMPTYPE		
Mainemp. only	-	
With supp. emp.	31.0	21.1
ACCMTYPE		
Single room	31.5	22.4
Flatlet	25.0	19.7
Flat	34.1	21.7
House	25.1	17.1
TRVRESN		
Employers	35.6	21.4
Personal	26.7	19.6
Family	33.3	23.5
Social & leisure	27.0	19.9

Note: *The acronyms of the criterion variables have the following meanings: RESPLACE = Place of Residence; OCCGRP = Occupation group; CAROWNED = Car Ownership; EMPTYPE = Type of Employment; ACCMTYPE = Type of Dwelling; TRVRESN = Reason for Journey.

TABLE 4: ADOPTED OCCUPATIONAL CATEGORIES

1	Employers and managers, small establishments Professional workers, self-employed
2	Senior professional workers
3	kIntermediate non-manual workers
4	Foremen and supervisors, manual Skilled manual workers Self-employed manual workers
5	Junior non-manual workers Personal service workers Semi-skilled and unskilled manual workers.

One implication of the above pattern of variation of the wage rate as a percentage of the value of time is that western practice of expressing values of time as a percentage of the wage rate may be too simplistic for application in third world countries such as Nigeria. Moreover, such derived percentage values may in fact not be transferable within and between countries; the degree of transferability will be conditioned on the similarity between the locations concerned in the opportunities available for multiple sources of income. Reinforcing the above line of argument is the scope for there to be significant variation in the wage increment to be added to the wage rate in order to derive the modified wage rate.

Returning to the appropriate values of Table 2, they suggest that there will be many instances when, for people engaged in supplementary employment, the utility of working time will be less than that of non-working time contrary to the postulation of equation (5) above; the logical assumption is made that the supplementary employment is conducted outside main working hours although it is recognised that this is affected by the nature of the employments concerned.

From the preceding discussion it has to be concluded that the evidence is conflicting on the validity of the freely variable working hours assumption underlying the utility maximising theory, for while evidence at the macro level is unsupportive, this is not so at the micro level, where skilled, professional and technical workers behave as if able to freely vary the number of hours they spend in remunerative employment. It must however be stated that this behaviour reflects the current state of development of the Nigerian economy and of available manpower resources. How long these conditions will remain is difficult to judge, but it is probably reasonable to assume an unchanged situation in the medium term.

Lastly, the question as to what is meant by 'freely variable working hours' is begged by the findings of this study. For if the desire to work longer

hours is conditioned on the need to ensure survival, then the hours worked cannot be said to be 'freely variable'.

3. CONCLUSIONS: TOWARDS MORE APPROPRIATE TIME VALUATION PRACTICE IN THE THIRD WORLD

At the beginning of this paper, the observation was made that recent shifts in practice have led to the valuation of urban travel time savings as part of total measured benefits of urban transport investment in the third world. It is however the case that rural travel time savings are still generally omitted from such measured benefits. This practice has origin in, among other factors, the low level of traffic historically typifying such roads and the imputed low economic worth of rural travellers (Odier, 1962) and (Millard, 1966). The conclusion of the author is that there exists little theoretical or empirical justification for the continued omission of travel time savings from the total benefits of rural transport proposals. This conclusion can be justified on several grounds, especially given the acceptance that monetary benefits should be ascribed to urban travel time savings.

The first is the philosophical ground that people do attach a value to their time as reflected in the common usage of words such as 'save', 'wasting', 'gain', etc. to describe particular allocations of time. In addition, 'time' is essentially a measure of 'life' and if the latter is 'valued', then so must the former. In a sense, it is the way in which 'time' is used and the extent this usage accords with what individuals desire from life that determines their judgement on the value (worthwhileness) of their 'life'. Thus, the basic question is not whether time has value but what value is attached to specific uses of time. Whilst this use-value of time will vary from individual to individual and be affected by several factors, it has a utility which, however small, will be valued irrespective of the person's geographical location. The effect that the latter factor has is to influence the use-value of time (lower or higher), not to reduce it to zero.

The second justification for the adoption of the same approach with respect to rural and urban travel is that, in many parts of the third world, rural travel is found to account for an increasingly large proportion of total travel. Furthermore, more and more governments are adopting policies which emphasise rural development. As a result, whereas in the past it has been the practice to assume that rural travellers were either of predominantly low income or that their travel activity was of low economic significance, the basis for making such assumptions is being progressively undermined. This is a trend that can be expected to be reinforced as governments devote greater efforts to the promotion of rural development in order to stem urban migration. Thus, a shift to the valuation of rural travel time savings has to be seen as a complementary aspect of the shift in recent years towards investment of more national resources in the development of rural areas.

Underlying the above arguments is the belief that equity considerations require that the approach recommended here be adopted. Travel time savings are basically intangible benefits (despite the apparent ability to establish their monetary value) the true value of which it is difficult,

if not impossible, to establish. Although it is possible to formulate coherent explanations and justifications for valuing time, the fact remains that how the saved time is used in the final analysis is for the individual to whom it accrues to determine; it is in this usage however lies the actual value of any time saved. All that government and policy-makers can hope is that more often than not, time saved will be used for beneficial purposes. In this situation however, given the element of uncertainty, 'beneficial' has to be defined not in its strict economic sense but 'as an increase in happiness' (Sharp, 1979). Clearly, rural travellers have as much interest in acquiring such a benefit as urban travellers. However, determining to attach values to travel time savings is one thing and quite another to establish what the appropriate values are. As concluded above, the two economic approaches currently providing a theoretical basis for time valuation practice are, for varying reasons, less valid in the third world.

The factors accounting for the above conclusions concerning the theoretical basis for travel time savings valuation are attributable primarily to the stage of development reached by most third world countries. In such circumstances it is possible to identify two contrasting patterns of behaviour: firstly, that associated with the need for basic sustenance, which means that people will often work for long hours in order merely to eke out a living; secondly, that prompted by aspirational urges which lead some workers to take on supplementary employment in order to be able to attain their desired social status.

The above two contrasting patterns are the result of, among other factors, the duality of the economy of many third world countries, a feature which creates the situation in which it is difficult separately to identify work and non-work travel, and, perhaps more importantly, to establish how such time savings are used. It also makes it difficult to determine people's real annual income and suggests the need for the collection of quite detailed income data as part of time valuation exercises: significant estimation errors must result from the common practice of estimating values of time from per capita and average market wage information.

Evidence presented in this paper and elsewhere (Banjo, 1981), and the deductive discussion of Howe (1976), indicates that there are likely to be significant number of instances when supposedly 'non-work travel' is more correctly described as 'work travel'. Where this is the case, reductions in the time which such types of travel consume should be valued as for working time savings.

It is of course possible for the converse of the above pattern to occur. This could arise, for example, from the earlier noted influence of cultural factors on people's perception of time in general, and working time in particular, and the attendant difficulties of ensuring that saved working time savings are productively used. Where such savings are not productively used, it does not follow however that work time savings should be valued as non-work time savings since the important consideration is the value to the employer. This value is likely to be based on considerations of the cost of employing labour and the usefulness of saving labour time. Hence, the appropriate value of the time concerned is still the resource value.

APPROPRIATE TIME VALUATION by: G. A. Banjo

The above last points have to be stressed owing to the possibility of this study's finding, that respondents themselves are likely to value working time savings less than non-working time savings, being erroneously interpreted as implying that it is the workers' perception of working time savings that determinesssuch time savings' resource value. The reality, of course, is that it is the employer who decides how working time savings are spent, a decision that one would expect to be much influenced by the opportunity cost, to the employer, of employing labour. This said however, there is clearly a need for time valuation practice in the third world to recognise that there are in fact two perceptions of the value of working time savings: that related to the behaviour of workers and that related to the opportunity cost to the employer of employing labour. Whilst the latter perception has hitherto enjoyed dominance in time valuation studies, there is a strong basis for arguing that the behavioural view should be taken more into account in such studies since it more closely reflect the actual resource value of saved working times. This change is all the more necessary inthe third world where resources of all kinds are scarce and there is thus a need to assure their optimum allocation. The effect of the current approach to the valuation of working time savings is to help justify transport investments whose attributed measured benefits will be largely unrealised owing to behavioural and developmental factors.

Finally, it has to be noted that whilst it is necessary to establish the value which people attach to travel time savings, it does not necessarily follow that these values should be used without qualification in travel demand analysis. A time valuation exercise is best seen as a means of collecting information to guide or verify policy decisions. The reason for this assertion is that the time values adopted for use in travel demand analysis have policy implications which cannot be ignored in third world contexts, especially since most government actions in these countries are directed at abhieving specific changes in behaviour rather than, as invariably the case in the more developed countries, facilitating existing behavioural patterns.

For these policy implications to be adequately understood however, it is necessary for time values to be derived within a framework whereby the effect on these values of people's time budgeting decisions can be examined. This conclusion is drawn because it is the need/desire of people to spend time (and travel time in particular) on different activities that makes them generally willing to pay to save time. As argued elsewhere (Banjo and Brown, 1981), people's time budgeting behaviour are such that it must influence their valuation of travel time savings.

Furthermore, it is necessary for time valuation studies to move away from its rather parochial transport sector setting into the wider context of exploration of costs and benefits of achieving time savings (especially work times) within the economy as a whole. It is only within this wider context that time valuation studies can better contribute to a more optimum and equitable allocation of resources between and within sectors of the economy.

APPROPRIATE TIME VALUATION by: G. A. Banjo

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TABLE 8.5(a): MEAN VALUES OF TRAVEL TIME SAVINGS, BASEVOT (NAIRA/HR): DIRECT ESTIMATION APPROACH.

	Travellers without supplementary employment			Travellers with supplementary employment			Travellers on employer's business			Travellers not on employer's business		
CRITERION VARIABLE	(1)	(2)	N(f)	(1)	(2)	N(f)	(1)	(2)	N(f)	(1)	(2)	N(f)
TRAVMODE												
1. Cartaxi	1.66 (0.88)	92	52	3.00 (0.93)*	142	16	1.59 (0.63)	87	11	2.10 (0.97)	109	65
2. Midibus	2.01 (0.86)	144	210	1.89 (0.89)	139	93	1.66 (0.69)	90	58	2.21 (0.87)	175	296
3. Aircraft	1.92 (0.91)	75	25	2.52 (0.83)	92	9	2.20 (0.98)	92	10	1.93 (0.86)	78	29
RESPLACE												
4. Lagos	1.93 (0.89)	125	189	2.05 (0.95)	149	83	1.76 (0.82)	100	45	2.13 (0.88)	150	280
5. Ibadan	2.06 (0.85)	144	76	2.41 (0.93)	116	22	1.65 (0.61)	77	26	2.43 (0.93)	190	82
6. Others	1.69 (0.61)	81	16	1.77 (0.54)	60	11	1.81 (0.75)	45	6	1.80 (0.65)	73	24
INITIME												
7. Morning	1.88 (0.87)	109	145	2.11 (0.84)	146	81	1.72 (0.63)	79	47	2.24 (0.88)	158	226
8. Afternoon	2.01 (0.87)	141	140	2.04 (1.08)	100	37	1.71 (0.90)	90	32	2.08 (0.88)	140	164
SEX												
9. Male	1.75 (0.74)	98	127	1.84 (0.92)	108	55	1.91 (0.79)	90	51	1.90 (0.85)	116	158
10. Female	1.50 (0.81)	134	47	1.77 (0.84)	113	19	1.46 (0.43)	82	7	1.75 (0.83)	155	72
OCCGRP												
11. Group 1	1.69 (0.88)	41	27	3.20 (1.01)**	97	11	2.11 (0.90)	44	3	2.32 (0.95)	53	42
12. Group 2	1.78 (0.69)	69	66	2.01 (1.08)	64	27	1.73 (0.75)	55	28	2.19 (0.94)	89	73
13. Group 3	1.93 (0.81)	212	104	2.42 (0.71)	181	43	1.77 (0.76)	148	36	2.21 (0.74)	223	134
14. Group 4	2.04 (0.99)	194	62	1.61 (0.76)	260	18	1.46 (0.65)	142	10	2.10 (1.03)	253	78
15. Group 5	2.74 (0.92)	483	20	1.20 (0.82)	255	18	1.00 (-)	364	1	2.10 (0.91)	404	51
CARDWNED												
16. None	2.01 (0.90)	185	204	1.80 (0.77)**	155	83	1.75 (0.72)	117	51	2.06 (0.88)*	200	281
17. One or more	1.78 (0.74)	64	81	2.76 (0.98)	100	35	1.65 (0.31)	54	27	2.44 (0.89)	95	109
INCOMEGT												
18. 1-2000	2.04 (0.87)	287	134	2.27 (0.91)	295	53	1.57 (0.62)	209	27	2.23 (0.87)	314	189
19. 2001-4000	1.88 (0.83)	92	67	2.16 (0.97)	116	23	1.97 (0.83)	109	21	2.17 (0.91)	110	79
20. 4001-6000	1.48 (0.64)	58	29	1.69 (0.75)	52	11	1.43 (0.40)	54	13	1.69 (0.51)	63	29
21. > 6000	2.05 (0.75)	48	18	2.20 (0.57)	46	8	2.00 (0.92)	45	13	2.54 (0.55)	47	17
EMPTYPE												
22. Main emp.only	1.94 (0.87)	123	289	-	-	-	1.67 (0.78)	85	55	2.01 (0.88)	236	230
23. With supp.emp.	-	-	-	2.09 (0.92)	128	118	1.77 (0.67)	73	19	2.15 (0.94)	157	99
ACOMTYPE												
24. Single room	2.19 (0.81)*	227	107	2.38 (0.92)	198	52	1.68 (0.64)	163	35	2.44 (0.88)**	246	146
25. Flatlet	2.01 (0.91)	118	63	2.49 (0.94)	199	26	2.00 (0.94)	213	10	2.23 (0.87)	144	102
26. Flat	1.58 (0.87)	75	93	1.68 (0.80)	75	33	1.57 (0.57)	48	28	1.75 (0.88)	99	110
27. House	2.04 (0.94)	108	23	2.08 (0.97)	48	5	2.23 (1.28)	73	5	2.18 (0.78)	88	26
TRPFRQ												
28. < Weekly	2.30 (0.88)	100	70	3.12 (1.00)**	130	18	1.61 (0.73)	66	15	2.76 (0.88)*	127	71
29. < Weekly > monthly	2.04 (0.91)	142	94	2.35 (0.62)	134	34	2.05 (0.85)	108	35	2.13 (0.79)	165	129
30. < Monthly	2.07 (0.93)	126	29	1.81 (1.00)	163	12	1.05 (0.62)	53	5	2.32 (0.87)	181	41
BACKTIME												
31. Same day	2.23 (0.93)	110	37	2.76 (0.89)*	178	23	2.08 (0.63)	131	13	2.70 (0.95)**	144	57
32. Next day	2.07 (0.93)	138	71	1.57 (0.67)	92	34	2.00 (0.81)	92	16	1.89 (0.84)	131	114
33. Within a week	1.70 (0.75)	114	87	1.91 (0.98)	118	29	1.56 (0.50)	70	15	1.94 (0.82)	132	114
34. After a week	2.02 (0.83)	138	81	2.31 (0.91)	143	32	1.53 (0.84)	74	33	2.49 (0.84)	211	96
TRVRESN												
35. Employer's	1.67 (0.78)	85	55	1.77 (0.67)	73	19	1.72 (0.75)	83	78	-	-	-
36. Personal	2.07 (0.85)	110	95	2.51 (0.93)	163	42	-	-	-	2.23 (0.85)	125	155
37. Family	1.97 (0.99)	152	83	1.87 (0.86)	161	38	-	-	-	2.08 (0.98)	172	149
38. Social and leisure	2.03 (0.77)	181	51	1.89 (1.12)	108	18	-	-	-	2.14 (0.81)	170	77
RTCHIC												
39. Via Abeokuta	1.23 (0.41)	-	3	1.33 (0.55)	68	6	2.00 (-)	51	1	1.56 (0.75)**	123	10
40. Via Snagamu	1.89 (0.77)	160	54	1.55 (1.15)	157	29	2.35 (0.75)	153	16	1.74 (0.87)	174	84
41. Via Expressway	1.98 (0.90)	118	210	2.33 (0.87)	137	74	1.58 (0.72)	75	56	2.27 (0.88)	146	267
42. Via Ijebu-Ode	1.76 (0.59)	117	10	2.63 (0.64)	122	7	1.27 (0.78)	54	4	2.88 (0.77)	181	25

Notes: See Table 8.1(a).