MODE SHIFT BEHAVIOR OF BUS PASSENGERS

TO RAIL SYSTEM UNDER IMPROVED RAIL OPERATIONS

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Abstract: The PNR Line going to the Bicol Region is currently being repaired for the eventual resumption of its service. Using a stated preference survey, this research aims to describe how passengers will decide to patronize the PNR service upon its service resumption and estimate the modal shift from bus to rail service. Also, the significant factors affecting mode choice of bus passengers are determined in the survey. In the SP survey, the main factors considered are travel time, travel cost, and access time. number of 900 bus passenger respondents originating from Manila and arriving at Naga City were interviewed for the SP survey. Results show that majority of the bus passengers would shift from their current mode to rail service with the study's given attribute levels. However, non-air conditioned bus passengers are more likely to choose their current mode considering all mode alternatives.

Keywords: Bus, Rail Service, Mode Shift, SP, Significant Factors

1. Introduction

The main line south of the Philippine National Railway also known as the Bicol Express has been suspended since October 2012 due a derailment incident. It was suspended in order to give time for the rehabilitation of the tracks which seems to be the primary issue of the Bicol Express. As part of the planning and preparation for its revival, a demand forecast is necessary. In this study, a discrete choice model of Metro Manila to Naga City bus passengers was developed. Through this model, the modal shift of bus passengers to rail system upon resumption, may be estimated.

Currently, since the PNR Bicol Express is still suspended, Manila to Naga travelers are limited to travelling via bus, airplane, or car. However, prior to suspension, the modal split among all alternatives mentioned is indicated in Figure 1.1. The modal split shows that the dominant mode of travel from Metro Manila to Naga City is the bus service. Hence, bus passengers were chosen to be the subject of study as to forecasting the demand for PNR service to Bicol.

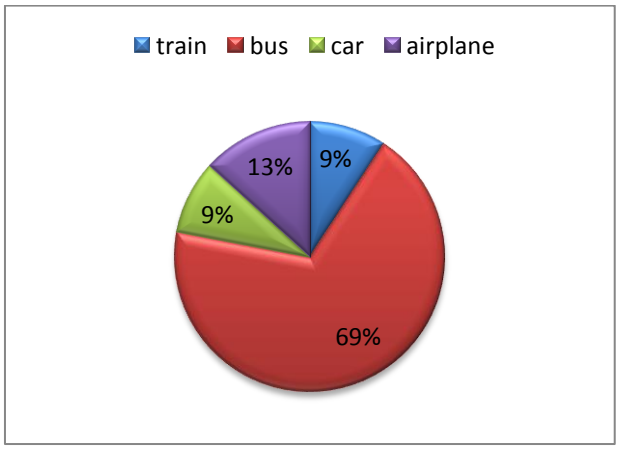

Figure 1. Modal Split of Manila to Bicol Travelers

PNR vs. Bus service

The route of Bicol Express starts from Tutuban station down to Legazpi City and stops at various stations as indicated in Figure 2. The Yellow markings on the other hand, signifies the stops of the bus service going to Naga City. In this figure, it can be seen that the PNR's route and the bus route is almost parallel, showing that the rail service can cater to the passengers located near the bus stops, once resumption pushes through. The passengers along the bus route are potential passengers of the Bicol Express.

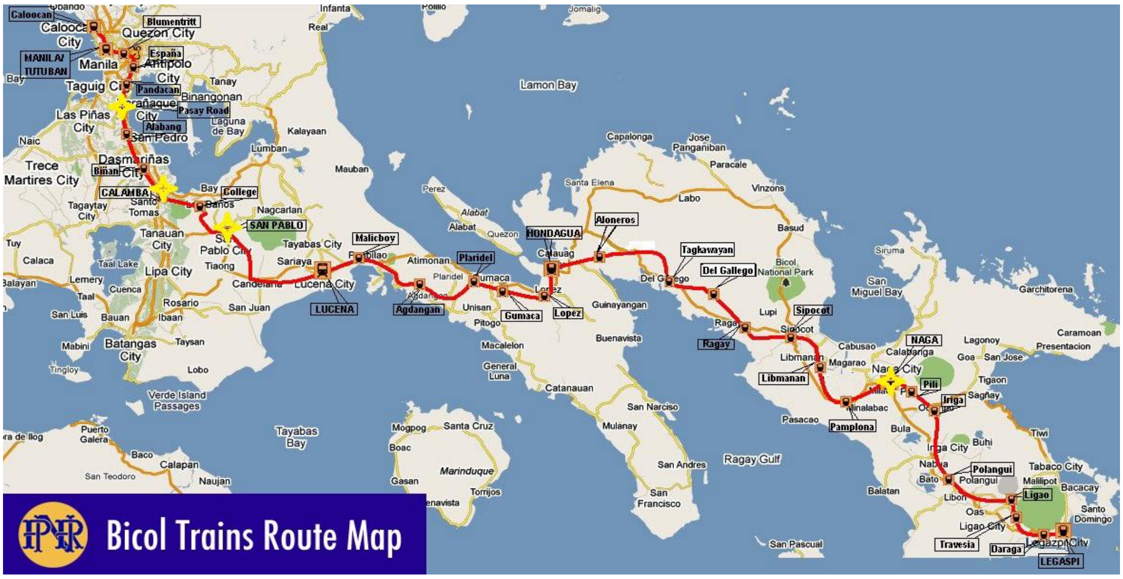

Figure 2. PNR Route and Bus Stops

However, to witness a shift from bus to rail, the perceived utility of the rail service must be greater than that of the bus service. Hence, significant factors affecting the mode choice of bus passengers were determined using a stated preference survey.

2. Construction of Survey Forms

To start the construction of the survey forms, the comparison of the two competing modes was done and presented in Table 1. In the said table, the modes are evaluated in different aspects such as travel time, fare, frequency of travel and station facilities. All of which are seen to be critical to the decisions of the travelers when choosing a mode alternative.

Table 1. PNR vs Bus Service

Features	**Bus service**	**PNR service**
average travel time	10 hrs	11 hrs
average frequency of travel	18 trips	1 trip
average fare	700 Php	700Php
Station/Terminal Facilities	Restrooms, Security adequacy varies from one terminal to another.	Station Office, Ticket Booth, Waiting Area, Parking Area, water, electricity, restroom, amenities for passenger loading ramp varies from one station to another

In terms of travel time, PNR has to adjust its travel time to be at par with the travel time of the bus service. Furthermore, the frequency of travel of bus service is incomparable to PNR service of once a day, making PNR service inferior when it comes to schedule frequency. The average fare of bus and PNR service are near each which suggests competition in terms of cost. In addition to this, there are more beneficial features in PNR stations which can also be improved. To further evaluate the performance of Bicol Express, we can compare its service to other rail operators in countries such as Malaysia, Thailand and Indonesia. As seen in Table 2, the average speed of Bicol Express needs to be improved an existing rail service from Bangkok to Chiang Mai is actually twice as fast as the rail service to Bicol.

Table 2 Summary of Rail Service Comparison in the Philippines and in Malaysia

Origin to Destination	Travel Time	Distance from Origin to Destination	Speed
Kuala Lumpur to Penang:	6 hours and 10 minutes	293.63 km	47.62 kph
Manila to Legazpi:	13 hours and 15 minutes	377.57 km	28.50 kph
Bangkok to Chiang Mai	12 hrs	751 km	62 kph
Saigon to Danang	16 hrs. 40 mn	614.28 km	36 kph
Jakarta to Surabaya	9 hrs. 40 min	522 km	53.98 kph

2.1 Factors Affecting Mode Choice

To choose the main attributes of the modes bus and PNR Bicol express that are were to be part of the survey, significant factors identified from other similar studies were considered. Tisher and Dobson (1979) did a study on the shifting of passengers to buses and carpools for the purpose of recommending policies. In their study, it was found that convenience is the most significant factor affecting the mode choice of passengers. Convenience can be measured through the access time which is the time from the address of origin to the bus terminal. In another similar study, Alvinsyan et al (2005), travel time and cost were considered significant and were used for the generation of the utility expression that will determine the probability of choosing a mode. More importantly, in a passenger survey conducted by CPCS, a Canadian company, it was found that passengers choose bus for travel time, fare, comfort and convenience as the leading factors affecting their mode choice.

2.2 Theory

The questionnaire survey is divided into four portions – the passenger's personal information, the basic travel information, as well as the route specific travel information. Passengers' personal information include gender, age, gross monthly income and civil Status. Basic travel information includes the details regarding the purpose and the frequency of travel. The Route specific travel information includes the details of the trip itself, asking the travel time, and estimated cost, of the passengers' revealed preference (bus service). Lastly, the fourth part of the survey involves the stated preference which includes the non-existing rail service. In this portion of the survey, the respondents are presented different scenarios for train 1 and train 2, train one representing the old rail service and train 2 representing the improved rail service. The respondents are asked to choose between train 1, train 2, and their current mode choice. The attributes of train 1 and train 2 have different ranges as indicated in Table 2.1. The values of these attributes have three levels differing from one scenario to the other. The ranges of values for each attribute were designed considering the comparison of bus and train modes as well as the comparison of PNR with rail service in other parts of Asia.

Table 3 Levels

Levels		
	Train 1	Train 2
Travel Time(hrs)	7	4
	9	6
	11	8
Travel Cost	800	1200
	600	1000
	400	800
Access Time	15	15
	30	30
	45	45

Given a multinomial Logit model, The probability of choosing an option is given by eq. 1.

$$P_i = \frac{e^{V_i}}{\sum_{j=1}^{J} e^{V_j}} \qquad \text{(eq.1)}$$

where: Pi is the probability of choosing mode i

Vi is the utility of the mode i

Vi is the utility of mode j

The Nested Multinomial Model is used when there are sub choices within an option. The options are called the nest and its sub choices are the branches of the nest/s. In this research, Figure 3 shows the Nested Multinomial Model of bus and rail service.

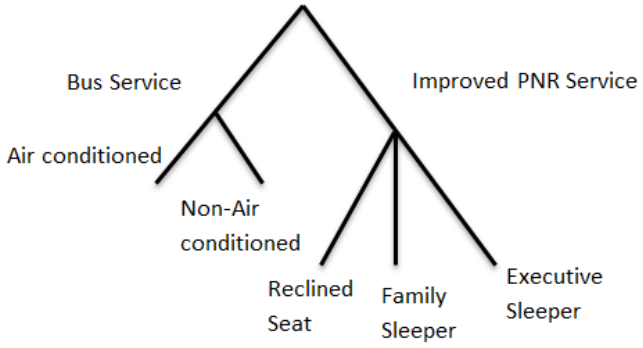

Figure 3 Nested Multinomial Model

In figure 3, when the traveler chooses between bus and rail services (nests), there are more options to choose from the next. Under the nest of bus service are the branches of the non-air conditioned and the air conditioned bus service. On the other hand, under the nest of rail service, are the branches of reclined seat, family sleeper, and execute sleeper of PNR Bicol Express. The

probability of choosing a nest between bus and rail service is given by eq. 3, while the probability of choosing among the branches is given by eq. 4. Note that the probability of choosing among the branches is dependent on choosing the alternative upon which it is nested.

$$P_{ni} = \frac{e^{V_{ni}/\lambda_k}\left(\sum_{j \in Bk} e^{V_{nj}/\lambda_k}\right)^{\lambda_k - 1}}{\left(\sum_{\ell=1}^{K} \left(\sum_{j \in B\ell} e^{V_{nj}/\lambda_\ell}\right)^{\lambda_\ell}\right)} \quad \text{(eq. 2)}$$

$$P_i = P(B).P(i \mid B) = \frac{e^{\mu(V_m + L_m)}}{\sum_{n \in N} e^{\mu(V_m + L_m)}} \cdot \frac{e^{\mu(\beta_m V_i)}}{\sum_{j \in J} e^{\mu(\beta_m V_i)}} \quad \text{(eq.3)}$$

3. Methodology

The first stage of the methodology is the construction of the survey forms. The design of the survey forms had the following assumptions: Non air conditioned and air conditioned bus have equal travel time. Train 1 has longer travel time but cheaper compared to train 2. Access time and egress time is the same for modes air conditioned and non-air conditioned bus. Access time equals egress time for modes train 1 and train 2. Surveys include personal information, route Specific Travel Information and the stated preference survey that include 27 scenarios, each having a distinct set of values for travel time, access time, and cost.

Survey forms were pretested to 60 respondents, 20 for each batch in order to evaluate the performance survey forms in getting the necessary data for the model. The survey form was modified based on the results of the pretested survey data which include the socio demographic characteristics of the respondents as well as their mode choice characteristics which is composed of their revealed preference and stated preference. The Modified survey forms were disseminated. The total number of respondents that participated in the survey is 900.

The 27 profiles were grouped into three blocks, each block having 300 samples. Each respondent answered one from a single block and were asked their preferred mode among alternatives. These samples were distributed to four different bus terminals in Metro Manila. These are the Cubao Terminal, Pasay Terminal, Alabang Terminal and Sampaloc Terminal. Other respondents from other bus terminals also participated in the survey but these were categorized as minor terminals. After data gathering, the surveys were evaluated for validity. Inconsistent answers and incomplete information were rejected and replaced with new samples. After verification, the survey data was categorized based on gross monthly income, gender, age, and bust terminal location. Finally, analysis was done by identifying the significant factors affecting mode choice, using the NLOGIT software.

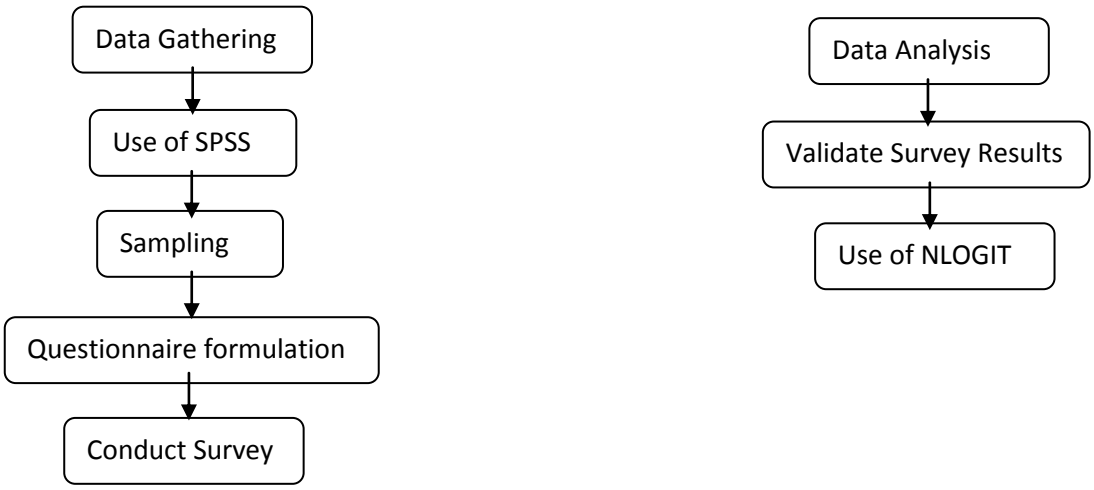

Figure 4 Research Design

4. Results

4.1 Characteristics of respondents

Figure 4 shows the location of the bus terminals where the respondents were interviewed. In this figure, it can be seen that majority of the respondents were interviewed in Cubao terminal, covering 48 percent of the whole 900 samples. The rest of the samples are divided to Alabang Terminal (10%), Pasay Terminal (20%) and Sampaloc (Legarda) Terminal (18%), while 4% of the sample size is from minor terminals and bus stops such as Alimall, Gil Puyat, Laguna Stop,Taft and Turbina. (Fig. 5)

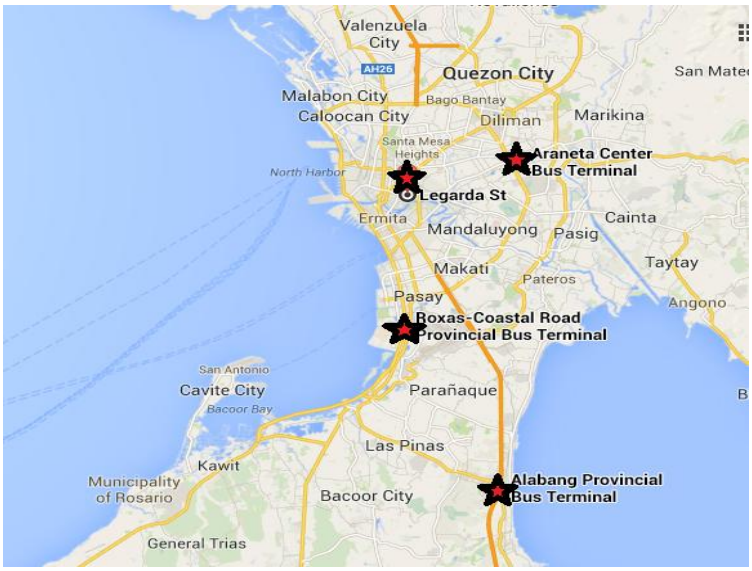

Figure 5. Sample Locations

In figure 6, it can be seen that the majority of the sample travel by bus to go home to Bicol or spend a vacation there. 66% of the respondents were female and 34% were male. 53% were married and 47% of the samples were single. However, gender and civil status were found to have an insignificant effect to the mode choice of the interviewed bus Passengers.

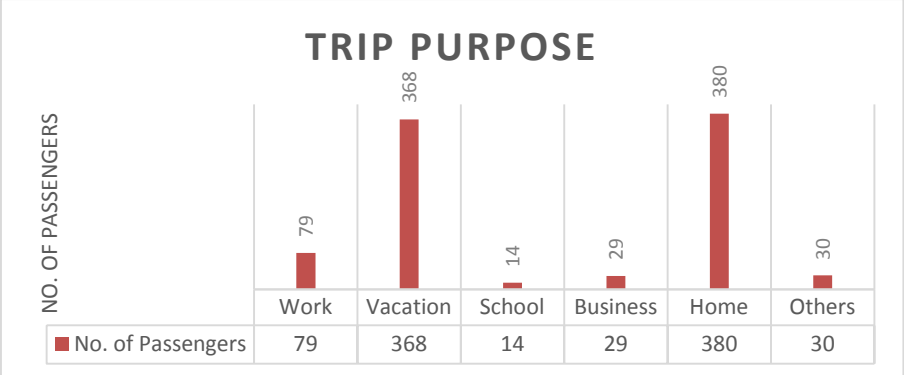

Figure 6. Trip purpose of bus passengers

Figures 7 suggest that the stated preference survey were answered by samples having the same gross monthly income for each block. The samples can also be characterized based on the modes they have tried using from Manila to their Bicol destination. In figure 9, it can be seen that 42% of the Manila to Bicol Travelers sample were also plane users, 14% are PNR users (before suspension), and 11% are car users.

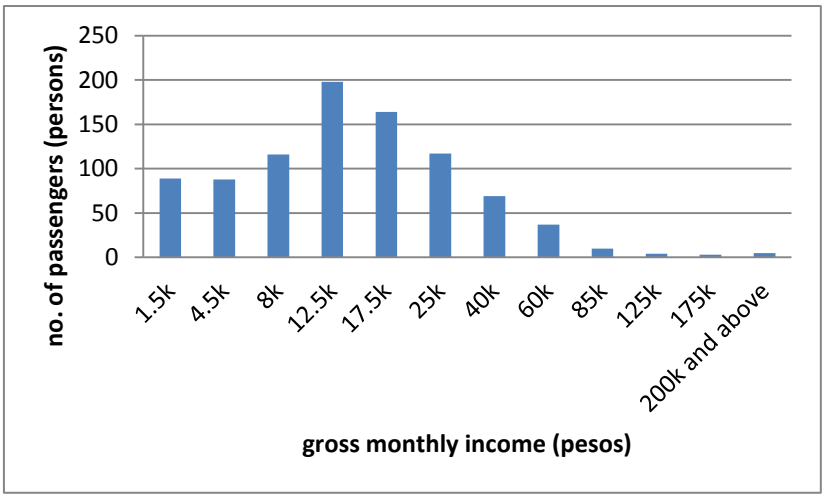

Figure 7. Gross monthly income of bus passengers

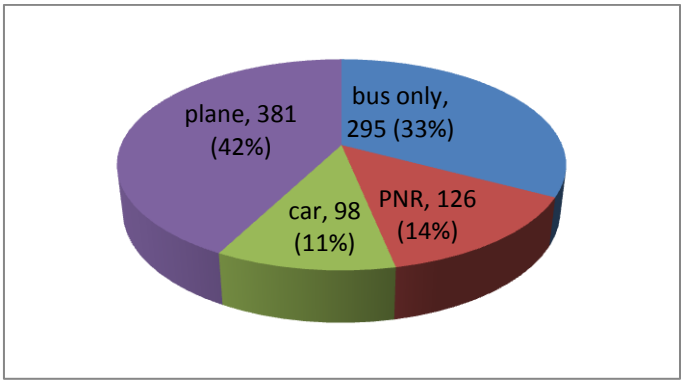

Figure 8. Manila to Bicol modes tried by respondents

4.2 Travel time and fare study in Naga City

Results show that 607 of the 900 respondents disembark at Naga City while the rest of the respondents disembark at other parts of the Bicol Region. The most frequently used egress modes in Naga City are jeepneys and tricycles. Other modes include boat, bus, taxi, private car, SUV, van, motorcycle and walking. (Fig. 9)

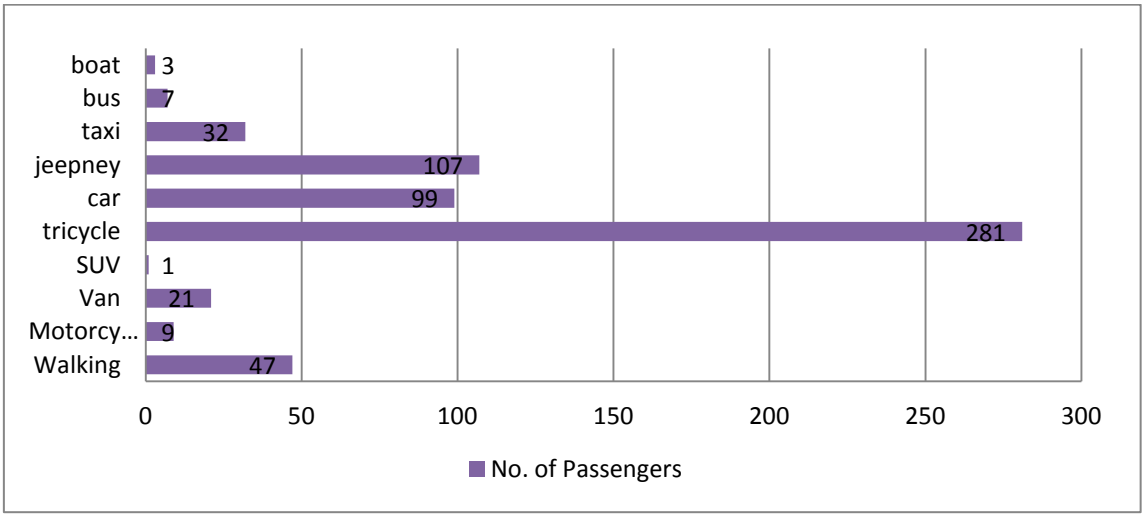

Figure 9. Tally of Egress Modes

To verify the answers of the respondents using these modes, a travel-time and fare study was conducted. In this study, the following data were obtained: the route from Naga City Terminal to the final destination of bus passengers, the egress time, and the egress cost. Also, the locations of the final destinations of passengers disembarking at Naga City were noted.

After the data gathering of the jeepney and tricycle routes, travel time, and cost from Naga Terminal to the destinations above, the obtained data were plotted to show the relationship of travel time and cost. (Fig. 11 and Fig. 12) The R-squared value of travel time vs. travel cost for jeepney is 0.6207, while the R-squared vale of travel time vs. travel cost for tricycles is 0.1437 showing that the relationship of the said parameters are more linear for jeepney. This is because majority of the tricycle routes to the destinations above are considered "special" destinations that require the same fare that is higher than the regular destinations for tricycles.

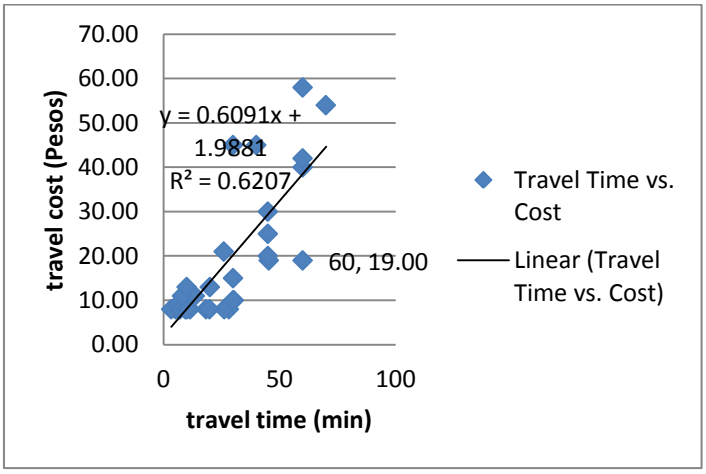

Fig 11. Travel time vs cost for Jeepneys

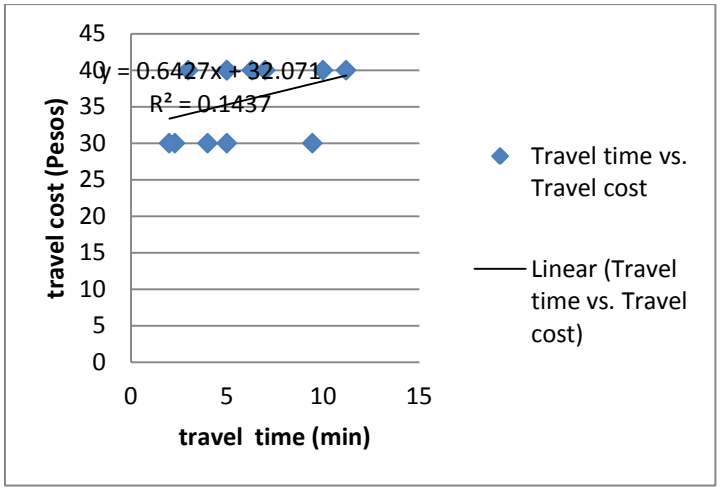

Fig 12. Travel time vs cost for Tricycles

4.3 NLOGIT Results and Descriptive Data

The answers of Passengers for each scenario was tallied for air conditioned bus, non air conditioned bus, train 1 and train 2. In table 5, it can be seen that in all scenarios, the train is preferred over the current mode choice (bus service). Train 2 is preferred in 20 of the 27 scenarios while train 1 is preferred in 7 of the 27 scenarios. As for the NLOGIT Results, Table 6 shows the NLOGIT results which include the tested variables and their respective coefficients and P-values. The variables include 'T_ORTR' - the time from the address of origin to the terminal/station, 'INVEHT' - the main mode (bus or PNR) travel time, 'COST_INC' - the ratio of fare over the gross monthly income of the respondent, 'A_AIRCON' - the air conditioned bus mode, 'A_NONAIR' - the non air conditioned bus mode, 'A_TRAIN1' - the train mode representing PNR Bicol Express, and finally 'PNR1' 'PNR2' and 'PNR3' - the experience of Bicol Express train. Negative coefficients indicate disutility while p-values less than or equal to 0.05 is considered significant.

Table 6 RPSP Model Results

Variable	Coefficient	P-value
T_ORTR	-0.00753012	0.0000
INVEHT	-0.13295796	0.0000
COST_INC	-1.07815774	0.0000
AIRXPNR1	-0.42136513	0.0000
A_AIRCON	-1.10946157	0.0000
NONXPNR2	-0.69919152	0.0022
A_NONAIR	-3.04327899	0.0000
TRAXPNR3	0.13927439	0.0071
A_TRAIN1	-0.21284050	0.0000
Statistical Significance		
Log Likelihood Function	-7811.674	
Log Likelihood zero coefficient	-11199.8721	
ρ^2	0.30252	
$\bar{\rho}^2$	0.30226	

The elasticity of variables were also obtained and are presented in table 7. Table 4 was used to classify the effects under inelastic or elastic. As seen in table 5, a percentage increase in access time of a particular mode in the choice set shows effects that are relatively inelastic for both direct and cross elasticity. As for travel time, a percentage increase in travel time of air

conditioned bus results to a relatively elastic effect on the probability of choosing that alternative while all cross elasticity for this particular change show relatively inelastic effects. Moving on, a percentage increase in travel time of non air conditioned bus show relatively inelastic effects for both direct and cross elasticity.

For train1 and train2, a percentage increase of travel time results to a relatively elastic effect on the probability of choosing that alternative as well as the probability of choosing the other train mode (train1 or train2). Finally, it can be observed that the effect of a percentage increase in cost/income shows greater effect than that of the increase in access time and travel time. This verifies the result presented in table 4, which shows the largest coefficient for variable COST_INC. For a percentage increase in cost/income for a certain mode among the choice set, the direct elasticity are relatively elastic. In addition to this, a percentage increase in cost/income for air conditioned bus, train1 or train2 also shows a relatively elastic for all cross elasticity except the mode non air conditioned bus.

Table 7 Elasticity and marginal effects of access time, travel time and travel cost/income

Effects of a percentage change in attributes in Air Conditioned Bus			
Choice	Total Effects of		
	T_ORTR	INVEHT	COST_INC
air conditioned bus	-0.68	-1.194	-9.682
Non air conditioned bus	0.001	0.022	0.179
Train 1	0.025	0.444	3.599
Train 2	0.041	0.728	5.904
Effects of a percentage change in attributes in of Non Air Conditioned Bus			
Choice	Total Effects of		
	T_ORTR	INVEHT	COST_INC
air conditioned bus	0.001	0.022	0.179
Non air conditioned bus	0.011	-0.189	-1.535
Train 1	0.004	0.063	0.514
Train 2	0.006	0.104	0.843
Effects of a percentage change in attributes inTrain1			
Choice	Total Effects of		
	T_ORTR	INVEHT	COST_INC
air conditioned bus	0.025	0.444	3.599
Non air conditioned bus	0.004	0.063	0.514
Train 1	-0.163	-2.886	-23.400
Train 2	0.135	2.378	19.287

Effects of a percentage change in attributes inTrain2			
Choice	Total Effects of		
	T_ORTR	INVEHT	COST_INC
air conditioned bus	0.041	0.728	5.904
Non air conditioned bus	0.006	0.104	0.843
Train 1	0.135	2.378	19.297
Train 2	-0.182	-3.211	-26.034

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ANNEX

Good day! We are students from De La Salle University and we are conducting a survey on public transportation service from Metro Manila to Naga City, Bicol. We would like to consider your response on which travel mode would you likely to choose. All information will be kept confidential and for academic purpose only. Your participation in this study would be highly appreciated. Thank you!

Personal Information

Name(Optional): _____ Age:_____ yrs. old

Civil Status: _____single _____married _____separated/widowed etc.

Gender: _____Male _____Female

Nationality: _____

Employment: _____Employed or Self Employed _____Unemployed or Student

Home Address (Barangay, Town, City):
_____

How much is your gross monthly income? In Pesos. (If Student, how much is your monthly allowance?)

____Below 3,000
____3,000 to 5,999
____6,000 to 9,999
____10,000 to 14,999
____15,000 to 19,999
____20,000 to 29,999
____30,000 to 49,999
____50,000 to 69,999
____70,000 to 99,999
____100,000 to 149,999
____150,000 to 200,000
____above 200,000

Please answer the following questions: Check only one

Basic Travel Information

1. What is the address of your origin? (Metro Manila Address - Barangay, Town, City): _____
2. What is the address of your destination? (Naga City Address - Barangay, Town, City): _____
3. What is the purpose of your travel? _____Work _____Vacation _____School _____business _____home _____others: Please specify: _____
4. How often do you travel to Naga City? (Encircle your answer)

						1	First time
1	2	3	4	5	6	7	Weekly
1	2	3	4	5	6	7	Monthly
1	2	3	4	5	6	7	Annually

5. Which bus company are you using in going to Naga City? _____
    a. At which terminal of the bus company are you taking the bus? _____

Route Specific Travel Information	Airconditioned Bus	Non-air conditioned Bus
1.) From your origin what travel mode do you use to go to the bus station? 1. Walking 5. tricycle 2. Motorcycle 6. car 3. Van 7.jeepney 4. SUV 8. taxi		

2.) How long does it take to travel from your address of origin to the bus station? 1. 0-15min 2. 16-30 min 3. 31-45 min 4. 46min-1 hr		
3.) From your origin, how much do you spend in going to the bus station? (Answer in pesos)		
4.) What is the estimated travel time in the main mode? (Answer in hours)		
5.) What is the estimated cost of travel in the main mode? (Answer in pesos)		
Where do you usually disembark? 1. end station 2. bus stop (Please specify:_____) 3. road side (Please specify:_____) 4. Others (Please specify:_____)		
6.) From the place of disembarkation, what travel mode do you use to go to your final destination? 1. Walking 5. tricycle 2. Motorcycle 6. car 3. Van 7.jeepney 4. SUV 8. taxi		
7.) How long does it take to travel from you place of disembarkation to your final destination? 1. 0-15min 2. 16-30 min 3. 31-45 min 4. 46min-1 hr		
8.) From your place of disembarkation, how much do you spend in going to your final destination? (Answer in pesos)		
9.) Do you usually carry any cargo when travelling to Naga? 1. Light cargo 2. Heavy Cargo		
10.) How much do you usually pay a stevedore to carry you cargo? (Answer in pesos)		
11.) Have you tried using PNR when it was operational? 1. Yes 2. No		

12.) What other modes have you tried using from Manila to Naga? ____BUS 1. Air conditioned bus ____ 2. Non-air conditioned bus ____ ____PNR 3. Reclining Seat ____ 4. Family Sleeper ____ 5. Executive Sleeper ____ ____Car When was the last time you used the car? ____ What is your estimated travel time? ____ How many times did you stop in your travel? (e.g. restroom, gas etc.) ____ How long do you usually spend during your stop-overs? ____ How many were travelling with you? ____ ____Airplane How much do you pay for your airfare? ____ What mode do you usually use going from airport to your final destination? ____ What is your estimated cost of travel from airport to your final destination?____ Whatis your estimated travel time from airport to your final destination?		

Given that PNR resumes to operate, in this page and the following pages, please make your choice in each scenarios presented. Train1 and Train2 represent the PNR service. Choose only one option per scenario. The following words in the next pages are defined as follows:

1. Travel time – Travel time in the train only
2. Fare – Cost of travel for PNR service, **without** the cost of travel from address of origin to the station and the cost of travel from the station to the address of destination
3. Access time – The time from your address of origin to the station

Scenario one

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	11	600	30
	TRAIN 2	4	1200	15
	Current mode choice	-	-	-

Scenario two

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	11	600	30
	TRAIN 2	4	1000	30
	Current mode choice	-	-	-

Scenario three

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	11	800	15
	TRAIN 2	8	1200	30
	Current mode choice	-	-	-

Scenario four

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	7	400	15
	TRAIN 2	4	800	15
	Current mode choice	-	-	-

Scenario five

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	11	400	30
	TRAIN 2	8	800	45
	Current mode choice	-	-	-

Scenario six

Choice	Mode	Travel Time	Cost	Access Time (min)
	TRAIN 1	11	600	45
	TRAIN 2	8	1000	15
	Current mode choice	-	-	-

Scenario seven

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	7	800	45
	TRAIN 2	4	1200	45
	Current mode choice	-	-	-

Scenario eight

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	9	800	30
	TRAIN 2	6	1200	15
	Current mode choice	-	-	-

Scenario nine

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	9	600	15
	TRAIN 2	6	1000	45
	Current mode choice	-	-	-

Scenario ten

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	9	400	45
	TRAIN 2	6	800	30
	Current mode choice	-	-	-

Scenario eleven

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	9	600	30
	TRAIN 2	4	800	45
	Current mode choice	-	-	-

Scenario twelve

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	7	600	45
	TRAIN 2	8	800	30
	Current mode choice	-	-	-

Scenario thirteen

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	11	400	45
	TRAIN 2	6	1200	45
	Current mode choice	-	-	-

Scenario fourteen

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	7	800	15
	TRAIN 2	8	1000	45
	Current mode choice	-	-	-

Scenario fifteen

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	9	800	45
	TRAIN 2	4	1000	15
	Current mode choice	-	-	-

Scenario sixteen

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	11	800	30
	TRAIN 2	6	1000	30
	Current mode choice	-	-	-

Scenario seventeen

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	9	400	15
	TRAIN 2	4	1200	30
	Current mode choice	-	-	-

Scenario eighteen

Choice	Mode	Travel Time	Cost	Access Time (min)
	TRAIN 1	7	400	30
	TRAIN 2	8	1200	15
	Current mode choice	-	-	-

Scenario nineteen

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	11	600	15
	TRAIN 2	6	800	15
	Current mode choice	-	-	-

Scenario twenty

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	9	400	30
	TRAIN 2	8	1000	30
	Current mode choice	-	-	-

Scenario twenty-one

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	8	600	15
	TRAIN 2	6	1200	30
	Current mode choice	-	-	-

Scenario twenty-two

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	11	400	15
	TRAIN 2	4	1000	45
	Current mode choice	-	-	-

Scenario twenty-three

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	11	800	45
	TRAIN 2	6	800	30
	Current mode choice	-	-	-

Scenario twenty-four

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	9	800	15
	TRAIN 2	8	800	15
	Current mode choice	-	-	-

Scenario twenty-five

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	9	600	45
	TRAIN 2	8	1200	45
	Current mode choice	-	-	-

Scenario twenty-six

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	7	800	30
	TRAIN 2	6	800	45
	Current mode choice	-	-	-

Scenario twenty-seven

Choice	Mode	Travel Time (hrs)	Cost	Access Time (min)
	TRAIN 1	7	400	45
	TRAIN 2	6	800	15
	Current mode choice	-	-	-