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Impact of Fluctuating Petrol Price on the Travelling Pattern of General Public in Hyderabad

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ABSTRACT

Recently the crude oil prices and the petrol prices has been observed to be moving substantially in the opposite direction among all the nations globally and the fluctuating retail petrol price is considered to have significant impact and influence specifically on the general public irrespective of any nation. The present paper examines the impact of fluctuating retail petrol price on the travelling pattern of general public of Hyderabad region of Telangana state and a structured questionnaire was administered to100 petrol vehicle using respondents by using convenient Sampling technique for data collection. Cross Tabulation, Factor Analysis were employed as analytical tools and the results of data analysis show that the travelling pattern of general public has been affected due to fluctuating of retail petrol price and the changes in travelling pattern shows that most of the respondents who were using petrol based vehicles are taking steps to save money on petrol by adjusting their Travelling pattern.

KEY WORDS: *Petrol price, Travelling pattern, General public, Cross Tabulation, Factor analysis.*

Introduction

Fluctuating petrol prices globally are directly affecting the development and future planning of the national economy. Rising fuel prices also indirectly leading to the increase of daily necessities such as food, public transport fares and so on. On 26 June 2010, the prices of petrol was decided to be market determined both at the refinery gate and at retail level, where the petrol prices was supposed be determined on market level but consistency in petrol prices was not noticed followed with no price revision of petrol price due to anti-competitive practices of state-owned Oil Marketing Companies (Dutta, 2013).Later to introduction of Market Determined pricing period the crude prices started fluctuating drastically in the international market which paved the way to Dynamic Fuel Pricing period.

In few nations, the rise of fuel prices resulted in rise in costs of travelling for both public and private transportation, which resulted the motorists to be more cautious and stingy in the consumption of fuel for vehicle and forced to go with rational approach for lessening the burden of the impact of rising fuel prices and Higher oil prices demanded reduction of overall expenditure among the people. The private vehicles users have no other option of adjusting with the travel patterns to be in accordance with the amount of income which resulted in reduction of expenditure on fuel. The Higher oil prices impacted the change of mode of private transport from car to motorcycle. There are some of previous studies that examined the relationship between oil prices with some variables such as the effect on consumer goods

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and services, the impact on total sales of motorcycles and cars, the impact on accident rates and the impact on travel patterns.

Review of Literature

Bomberg & Kockelman[1], carried research with 500 respondents to find impact of increasing crude oil prices on travel distances of private vehicle users which, came up with a finding that the respondents had the habit of reducing their trips at the time of rise in crude oil prices. **Bento et.al**[2], Investigated a research on 1700 respondents from Los Angeles for a period of 8 weeks, so as to find the impact of changing crude oil prices on reaction of drivers and the associated attitude towards carpooling. The research resulted that most of the commuters shared vehicles in response to the increased in oil prices. **Isaac & Simon**[3], came up with a conclusion that rise in fuel prices beyond its current price will result in vulnerability of poor households. **Sallee et.al 2010**[4], carried a research to find the fuel savings intention of buyers of car in India and suggested that consumers are ready to pay extra amount so as to reduce the present value of fuel costs. **Rohani &Pahazri**[5], threw light on rising fuel prices shocks impact on the Malaysians with consideration on three types of trip patterns. **Shailesh K. Kaushal**[6], attempted to examine the buyer behavior in reference to car purchase intentions and automobile marketing strategies in Uttar Pradesh.

Problem Identified

India is an economy which majorly satisfies its 75% of petroleum consumption requirements through the medium of imports mostly through Oman Dubai, west Texas where a wide range of products are refined from petroleum, in which petrol product constitutes to a major part and is used by a wide range of public, irrespective of social class in the society. The volatility in the crude oil prices and petrol prices are affecting on the general public globally, so a fluctuation in the petrol price could affect a common man in different aspects related to their travelling pattern, expenditure and so on Hence, with this scenario need to study the effect of fluctuating petrol prices on general public has been initiated in the present study.

Objective of the study

- To identify the opinion of general public on fluctuating retail petrol price.
- To study the impact of petrol price fluctuations on travelling pattern of general public.

Hypotheses

$1H_0$: There is no significant difference among the opinion of general public in relation to the retail petrol price.

$1H_a$: There is a significant difference among the opinion of general public in relation to the retail petrol price.

$2H_0$: Fluctuating petrol price doesn't have a significant impact on the Travelling Pattern Behavior of General Public.

$2H_a$: Fluctuating petrol price have a significant impact on the Travelling Pattern Behavior of General Public.

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Defining Variable for study:

- Petrol price- Independent variable
- Travelling pattern- Mediating variable
- General public- Dependent variable

Research methodology

The general public of India as well as other oil importing nations are facing the similar problem of Fluctuations of petrol price so with this scenario the study becomes exploratory in nature. The sample of this study collected data from Government employee, Private employee, Business, Student etc. The sample size of 150 people has been finalized according to the requirement of the research, out of which 100 respondents have replied.

Data Collection

The present research has collected Data by using two methods, one is from secondary sources where data of information of crude oil and retail petrol price has been collected from bankbazar website and petroleum planning and analysis cell website of India from different papers, publications, and websites and so on followed with primary data which has been collected from various platforms like Observation method, Expert opinion method, Interview method, filling up of questionnaire through Google forms.

In the data collection process questionnaire was shared among the Hyderabad and Secunderabad region of Telangana state and for the analysis purpose respondents who were using petrol based vehicles has been targeted in the survey and in the questionnaire the respondents were asked about their demographic information followed with opinion of petrol price followed with behavior of travelling pattern associated with the fluctuation of fuel price.

Sampling Method: Convenient Sampling Method has been used in the present study.

Research Instrument: Structured questionnaire has been used in the present study.

Mode of Survey: Personal interview, telephonic interview and Google forms has been used in the present study.

Place of Study: Telangana state-Hyderabad region.

Data Analysis

Cross tabulation analysis of Demographic data with the opinion of respondents on Petrol price-the calculation of cross tabs on the SPSS.16 Software came with an analysis as given below

1) Gender: The Table no.5 from Appendices shows the information of respondents on gender basis where the maximum number of respondents are from both male and female category and share the maximum amount of opinion constituting to 89% share on retail petrol

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price that it is costly and very costly. Further the results of Pearson's chi-square test shows that the Asymp. Sig. (2-sided) value demonstrates P value as 0.230.

2) Age: Majority of the questionnaires was answered by the respondents falling in the age group of 18 to 35 years constituting to 70% and the remaining 30% from 36 years to more than 55 years, followed with the results of Pearson's chi-square test as 0.195 in the Asymp. Sig. (2-sided) value which demonstrates P value and based on the findings it is analyzed that most of the respondents belong to very tender Age group with maximum utilization of vehicles and they share a common opinion on petrol price to be costly.

3) Occupation: Occupation of respondents is taken into considered as it can provide the basic knowledge on opinion on petrol pricing policy among the general public, where the dominant occupation among the respondents are from Private employee constituting to 51% of share with a demonstrated P value as 0.001.

4) Educational Qualification: The other finding of survey was that the most of the respondents were qualified with graduation and post-graduation degree constituting to 77% with a 0.000 value of Pearson's chi-square so, it is analyzed that most of the respondents are highly educated and are aware of price build up with tax portion shared by state and central governments and are worried of petrol price changes.

5) Monthly Income: The Table no.9 from Appendices shows the information of respondents in context to Monthly Income, where Maximum number of families income lies between 10,000 - 30,000 Indian Rupees and 6% of respondents belong to 70,000 to more than 2,00,000 Indian rupees bracket followed with the results of 0.127 as Pearson's chi-square test (P Value), implying a harsh effect associated with rise of petrol price on the respondents who are forced to maintain a separate budget for expenditure on petrol.

6) Vehicle usage: In the survey it was found that majority of the respondents have two wheeler in their family constituting to 84% followed with 6% to respondents who hold only four wheeler and the remaining 10% of respondents hold both two wheeler and four wheeler simultaneously so, it shows that most of the respondents are contributing in fuel consumption and are worried of fluctuation of petrol prices

Further, the results of Pearson's chi-square test showed in the Asymp. Sig. (2-sided) value of all the above calculations demonstrates that most of the P value are more than 0.005 resulting in Acceptance of Null Hypotheses (H_o) alternatively, rejecting Alternative Hypotheses (H_a), Hence proving that "There is no significant difference among the opinion of general public in relation to the retail petrol price", so it is summarized and analyzed that dominant majority of respondents based on Demographic pattern share the common opinion that petrol price in Hyderabad city is Costly and very Costly.

Factor analysis

To fulfil the second objective, Factor analysis has been utilized as, it has been used to study the factors affecting the travelling pattern of general public. Factor analysis has been

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considered as most applicable tool to summarize and decrease the huge number of variables to few factors so as to fulfill the objectives of research.

1. KMO and Bartlett's Test: In order to apply the factor analysis it is mandatory to find the strength by way of conducting reliability and validity test and it is conducted by KMO and Bartlett test for Sphericity (Hair et.al. 2009).

Table No. 1 - KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.675
Bartlett's Test of Sphericity	Approx. Chi-Square	206.701
	Df	28
	Sig.	.000

Source: Authors calculation from SPSS.16

Kaiser-Meyer-Olkin (KMO) test is considered as Measure of Sampling Adequacy where, the KMO value fluctuates between 0 to 1. Smaller values of KMO represents that correlation among couple of variables are not justified by other variables so it is mandatory that the value should exceed 0.50 so the above Table no.1 representing the KMO value to be 0.675 which represents that the factor analysis is suitable for present study, Followed with Bartlett's test of Sphericity with Approx. Chi-Square value as 206.701 proved to statistically significant at 0.05 level of significance (P value) 0.000< 0.05 which represents that the sample is sufficient to compute the impact of Fluctuating Petrol Price on Travelling pattern behavior of general public. Hence, from the above results, it is evident that the data collected are valid and further study on this data set will be considered valid.

2. Communalities: The values appeared in the communality table must be greater than 0.4 i.e. the values of communalities should be greater than 40%. In the Table no.2 most of the values of extraction column are more than .4 at the Eigen value. It means data is valid to test with factor analysis.

Table No. 2 - Communalities

	Initial	**Extraction**
TP1	I use my 2/4 wheeler to work place.	.563
TP2	I use my 2/4 wheeler for leisure trips like long drives, picnics etc.	.471
TP3	I use my 2/4 wheeler for personal trips like banking, shopping etc.	.724
TP4	I would go for public transportation to work place in case of extreme petrol price hike.	.677
TP5	I would prefer to use my 2 wheeler more compared to 4 wheeler.	.545
TP6	I would like to share my ride with new Bike/Carpooling Apps. like Quickride, Rapido etc.	.558
TP7	I prefer to go by walking, cycling for shorter distance travelling.	.394
TP8	I feel cost of travelling is increasing in both public and private transportation modes.	.532

Extraction Method: Principal Component Analysis; Source: Authors calculation from SPSS.16

The Communalities value represents the significance of variables in interpreting the impact on fluctuating petrol price on general public of Hyderabad region in travelling aspect. Further it is depicted that the factors such as usage of 2/4 wheeler to personal trips ,work place,

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personal trips and opting for public transportation to work place in case of extreme petrol price hike has an higher impact on travelling pattern of general public .

3. Total Variance Explained: Factor analysis is applied as a data reduction or structure detection method. The results of the factor analysis, after the Varimax rotation, has grouped the data into two factors.

4. Component Matrix and Rotated Component Matrix:

Table No. 3 - Factors loading of Travelling pattern of General Public in Hyderabad region

Variable	Component	
	1	2
TP1	.750	-
TP2	.668	-
TP3	.850	-
TP4	-	.823
TP5	.577	-
TP6	-	.745
TP7	-	.614
TP8	.721	-

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
Source: Authors calculation from SPSS.16

The Table no.3 exhibits the information of preferred variables for factor analysis with the highest factor loadings as 0.850, 0.750, 0.721, 0.668, and 0.577 for variables TP3, TP1, TP8, TP2, and TP5 which constitute to factor 1, Where the influencing factors are described as using the 2/4 wheeler while travelling to their work place, leisure trips, personal trips, prefer to usage of 2 wheeler more compared to 4 wheeler and rise in cost of travelling in both public and private transportation modes followed with the second influencing factors as usage of public transportation to work place in case of extreme petrol price hike followed with sharing of ride with new Bike/Carpooling Apps. Like Quickride, Rapido etc. and opting for walking, cycling for shorter distance travelling.

Findings

Hypotheses-1 Findings based on Cross tabulation

The results of Pearson's chi-square test from Cross tabulation shows the Asymp. Sig. (2-sided) value demonstrated with P value, where most of the values are more than 0.005 which resulted in Acceptance of H_o and rejection of alternative Hypotheses (H_a) proving that "There is no significant difference among the opinion of general public in relation to the retail petrol price", so it is summarized and analyzed that majority of respondents based on Demographic distribution share the common opinion that petrol price in Hyderabad city is Costly and very Costly.

Hypotheses-2 Findings based on Factor analysis

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- The principal component analysis of factor analysis calculated the sub variables of travelling pattern behavior of questionnaire where it resulted with the highest factor loading of 0.850, 0.750, 0.721, 0.668, and 0.577 respectively which constituted to factor 1, so therefore it can be analyzed that most of the general public share the common opinion in travelling pattern behavior that most of the People prefer to use their 2/4 wheeler for travelling to work place, travelling to personal trips like banking, shopping etc. simultaneously respondents feel that the cost of travelling is increasing in both public and private transportation modes and this is due rise in petrol price and most of the respondents prefer to use their 2 wheeler when compared to 4 wheeler due to fluctuating petrol prices.
- Other major finding of factor analysis is that most of the respondents prefer to opt the public transportation to work place in case of extreme petrol price hike and it is also found that most of the respondents are getting attracted to share their ride with new Bike/Carpooling Apps. Like Quickride, Rapido etc. because of fluctuating petrol prices in Hyderabad city.
- Hence it is proved that "Fluctuating petrol price have a significant impact on the Travelling Pattern Behavior of General Public" indicating the rejection of (H_o) and acceptance of alternative Hypotheses (H_a).

CONCLUSION

The study concludes that the fluctuation of petrol price has a negative impact on the travelling pattern of general public in the study area and most of the respondents share a common opinion regarding petrol price that it costly and due to rise of petrol price most of the respondents are opting to various modes of travelling like going for walking and selecting cycling for shorter distance travelling and sharing their ride with new car and bike pooling Apps so, as to lessen the burden of fluctuating petrol price, further the fluctuation of retail petrol price is due to international crude oil price followed with various determinants like OMC Margin, Excise tax, VAT, Dealer Commission etc. which play an important role in retail petrol price.

LIMITATIONS

- The present study has strictly collected data from regions of Hyderabad and Secunderabad of Telangana state so, it is difficult to generalize the findings to the whole India.
- The present study is confined only to petrol prices excluding diesel and other petroleum by product prices.
- The present study has considered only non-commercial public.

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APPENDENCES

Table No. 4

Period	Crude oil price(US $ per Barrel)	Petrol price (highest)
Jan2019	58.16	71.36
Feb2019	58.71	71.73
Mar2019	64.10	72.89
Apr2019	66.60	73.13
May2019	70.41	73.07
June2019	70.74	66.19
July2019	62.46	73.47
Aug2019	63.72	72.86
Sep2019	59.81	74.46
Oct2019	61.53	74.67
Nov2019	59.77	74.86
Dec2019	62.27	75.04
Jan2020	65.11	76.07
Feb2020	65.22	73.19
Mar2020	55.40	71.75
Apr2020	35.93	69.63
May2020	20.20	71.26

Source: bankbazar.com, ppac

Table No. 5 - T1014 * T1001 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.306[a]	3	.230
Likelihood Ratio	4.751	3	.191
Linear-by-Linear Association	1.179	1	.278

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Table No. 5 - T1014 * T1001 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.306[a]	3	.230
Likelihood Ratio	4.751	3	.191
Linear-by-Linear Association	1.179	1	.278
N of Valid Cases	100		

Source: Authors calculation from SPSS.16

Table No. 6 -T1014 * T1002 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	15.927a	12	.195
Likelihood Ratio	16.337	12	.176
Linear-by-Linear Association	.062	1	.803
N of Valid Cases	100		

Source: Authors calculation from SPSS.16

Table No. 7-T1014 * T1003 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	32.045a	12	.001
Likelihood Ratio	24.257	12	.019
Linear-by-Linear Association	.232	1	.630
N of Valid Cases	100		

Source: Authors calculation from SPSS.16

Table No. 8 -T1014 * T1004 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	45.743a	12	.000
Likelihood Ratio	28.200	12	.005
Linear-by-Linear Association	6.869	1	.009
N of Valid Cases	100		

a. 14 cells (70.0%) have expected count less than 5. The minimum expected count is .02. Source: Authors calculation from SPSS.16

Table No. 9 -T1014 * T1005 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	17.657a	12	.127
Likelihood Ratio	18.326	12	.106
Linear-by-Linear Association	1.205	1	.272
N of Valid Cases	100		

a. 14 cells (70.0%) have expected count less than 5. The minimum expected count is .02.

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Source: Authors calculation from SPSS.16

Table No. 10 -T1014 * T1006 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.482[a]	6	.870
Likelihood Ratio	3.588	6	.732
Linear-by-Linear Association	1.068	1	.301
N of Valid Cases	100		

Source: Authors calculation from SPSS.16

Table No. 11 -Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.932	36.647	36.647	2.932	36.647	36.647	2.605	32.568	32.568
2	1.532	19.153	55.801	1.532	19.153	55.801	1.859	23.232	55.801
3	.971	12.138	67.938						
4	.821	10.259	78.198						
5	.592	7.394	85.592						
6	.539	6.741	92.332						
7	.325	4.067	96.399						
8	.288	3.601	100.000						

Extraction Method: Principal Component Analysis.
Source: Authors calculation from SPSS.16